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The Effect of a Mandatory Second Opinion Program on Medicaid Surgery Rates—An Analysis of the Massachusetts Consultation Program for Elective Surgery

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Health Care Financing Grants and Contracts Report

The Effect of a Mandatory Second Opinion Program on Medicaid Surgery Rates--An Analysis of the Massachusetts Consultation Program for Elective Surgery

This analysis was supported by grant #18-P-97037/1-01/ from the Health Care Financing Administration, U.S. Department of Health and Human Services, and with funds provided by the Commonwealth of Massachusetts, Department of Public Welfare.

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Published by DHHS
Health Care Financing Administration
Office of Research, Demonstrations,
and Statistics
September 1980

ACKNOWLEDGEMENTS

The authors of this report would like to express their appreciation for the cooperation of the five Massachusetts Health Care Foundations, particularly Central Massachusetts and Bay State, where project staff collected data on patients.

A number of individuals who contributed to the analysis deserve special mention: Joseph Blackburn and Greta Ljung assisted in the time series analysis; Richard Potts completed the programming required to obtain an accurate surgery count from the Medicaid paid claims files, and Carol Greenfield assisted in the analysis of patients referred to the second opinion program.

We are also grateful for the assistance and support of staff at the Department of Public Welfare's Medical Division and Office of Management Services.

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EXECUTIVE SUMMARY

The Consultation Program for Elective Surgery, mandated by the Massachusetts legislature and established by the Department of Public Welfare, requires Medicaid recipients proposed for certain operations to obtain a second opinion as a precondition of Medicaid reimbursement for the surgery. The program is characterized by the following features:

- Medicaid recipients without other health insurance are required to participate in the program when proposed for one of the following eight procedures: tonsillectomy/adenoidectomy; hysterectomy; hemorrhoidectomy; cholecystectomy; meniscectomy; submucous resection/rhinoplasty; excision of varicose veins; and disc surgery/spinal fusion.

- The target population of 433,300 is composed primarily of persons under the age of 21 and adult females.

- Two different program models are utilized. In three regions of the state, a hands-on model is used whereby a physician consultant examines the patient to confirm the need for the proposed surgery. In the remaining two regions, a desk-audit model is used whereby pre-set criteria are used to screen the patients and only if the patient's condition does not meet the criteria is a physician consultation required. Under both program models, if the first consultant does not confirm the need for the proposed operation the patient must obtain a second consultation to complete program requirements.

- Once a patient has completed the program the choice to have surgery is the patient's and legitimate provider claims for the operation will be reimbursed by Medicaid according to the standard fee schedule, regardless of whether the physician consultant confirmed the need for surgery.

- Patients are referred to the program by the surgeon who proposes to perform the operation.

- Five health care foundations are under contract with the state to administer the program. Each foundation covers an area that corresponds to one of the state's five PSRO regions.

The program was implemented over a 14-month period beginning in March, 1977. During the first year of program operations in each region, a total of 4,864 persons was referred to the program. Of the 2,758 patients referred to the hands-on model areas, 82% had consultations, 10% cancelled and 8% were waived from the consultation requirement. In the desk-audit areas, 86% of the 2,107 referred patients met the criteria and of those not meeting the criteria, 91% had the required consultation(s) and 9% either cancelled or were waived from the consultation requirement because of travel hardship. Of the 577 physicians who provided second opinions during the first year, 97% were surgeons and the remaning 3% were internists or pediatricians. Ninety-six percent of the physician consultants were board certified, 2% were board eligible, and the board status of the remaining 2% was unknown. Statewide Medicaid expenditures for the program were $293,800: 77.0% for administration, 22.5% for physician services and 0.5% for diagnostic tests.

It was expected that the program would lower the number of operations for the target population through a direct program effect on persons referred to the program who forego surgery, and through a sentinel effect whereby surgeons would propose fewer operations. The Health Care Financing Administration awarded the Department of Public Welfare a grant to assess the program's effect on surgery rates and to determine whether the program was cost-effective.

Two seperate analyses of the program's effect on surgery rates were conducted: an analysis of monthly surgery rates for each procedure in each region from May 1975 to December 1978 and a study of the program dispositions and surgery decisions of 2501 patients referred to the program in two regions which cover 65% of the target population.

The surgery rate analysis attributed an observed decline in surgery rates after program implementation to the program when the drop in rates was statistically significant ($p < .05$) and there was no evidence of a declining trend prior to the program that would account for the drop, and there was no evidence of any other factors that might have accounted for a drop at the same time.

The analysis of program participants involved tracking 2501 patients through the Medicaid billing system or hospital records to determine if the originally proposed surgery had been performed by December 1978. The length of follow-up ranged from over a year for 60% of the patients to 3-5 months for 5% of the patients. A conservative estimate of the number of foregone surgeries attributable to the program assumed that only a portion of the patients not confirmed by the first consultant who did not have surgery were affected in their no-surgery decision by the program. A generous estimate assumed that all patients who had a consultation and those who never showed for a scheduled consultation and not having the proposed operation were deterred by the program.

All savings estimates take into account the cost of alternative treatments for patients who did not have the originally proposed surgery.

Two additional points about the scope of the analysis should be made: 1) the limited amount of post-program data allowed an assessment only of the program's short term impact, and 2) the project did not examine quality of care issues, nor attempt to identify which operations were necessary or the extent to which foregone surgeries represent unnecessary surgery.

The principal findings of the study are as follows:

- In the two regions of the state with at least 12 months of post-program data available and where the hands-on model is used there was a 20% reduction in the number of operations in the year following program implementation compared to the previous year.
- The statewide analysis of the program also indicates a 20% reduction in the number of operations in the year following program implementation. This finding must be considered preliminary, since less than 12 months of post-program data were available for 3 of the 5 regions of the state.
- The program was associated with a reduction in surgery rates for all procedures except disc surgery/spinal fusion in at least one region of the state. The greatest percentage reduction statewide was for hysterectomies (26%), hemorrhoidectomies and meniscectomies (23%) and tonsillectomy/adenoidectomy (22%).
- There was a decline in the rate of covered procedures in all 5 regions. The greatest decline in rates was in the area that had the lowest surgery rates prior to the program (the Boston metropolitan area).
- Two of the three areas using the hands-on model had rate decreases of over 20%. The remaining hands-on area covers only 3% of the target population and the low volume of operations and limited post-program data made it difficult to identify significant changes in rates. While the two areas using the desk-audit model had limited post-program data, one

area (with 10 months of post-program data) indicated a 7% decline in the number of operations, the other (with 7 months of post-program data) indicated a 24% decline. The larger decline in the second area is attributable to a sentinel effect as fewer than 80 patients had physician consultations in that region.

- In the two regions studied in depth, 14.5% of the 2501 patients referred to the program did not have the need for surgery confirmed by the first consultant. Over 20% of the patients proposed for hysterectomy, disc surgery/spinal fusion and meniscectomies did not have the need for surgery confirmed by the first consultant.
- Seventy-two percent of the 2501 referred patients had the originally proposed surgery, 22% had no surgery, 4% had a related surgery, and the surgery status of 2% of the patients was unknown. 93% of the patients having surgery did so within 3 months of the date of their referral to the program.
- The likelihood of patients having the proposed surgery was related to the opinion rendered by the first consultant: 85% of the patients whose need for surgery was confirmed by the first consultant had the operation, compared to 31% of the patients who were not confirmed.
- Estimates of program savings differ based on the two approaches used to assess program impact. Only the surgery rate analysis takes into account any sentinel effect. The analysis of program participants requires assumptions about which patients referred to the program do not have surgery as a result of it. In the two regions where both approaches were applied program savings estimates range between $94,202 and $657,265. The project's best estimate of net program savings to Medicaid in these two regions is $442,400 for a cost-benefit ratio of 1:3.6.
- The estimates of statewide net savings to Medicaid during the first year based on the surgery rate analysis are $856,500 for a cost-benefit ratio of 1:3.9. This estimate is based on limited post-program data for 3 regions of the state.

CHAPTER I. INTRODUCTION

The Commonwealth of Massachusetts began implementation of its mandatory Consultation Program for Elective Surgery (CPES) for Medicaid recipients in 1977. The results of this statewide program are of significant interest to state and federal policy makers concerned with the performance of a second opinion program (SOP) as a means of reducing health expenditures.

The program covers eight elective surgical procedures: tonsillectomy/adenoidectomy (T&A); hemorrhoidectomy; cholecystectomy; menisectomy; submucous resection/rhinoplasty (SMR); excision of varicose veins; hysterectomy: and disc surgery/spinal fusion. Participation in the CPES is mandatory for all Medicaid recipients with coverage for inpatient benefits but no other third party coverage, a population of approximately 430,000. A surgeon must refer the patient to the program, and over 96 percent of the participating consultants are also surgeons.

It is important to note that while participation in the program is mandatory, once the patient has completed the program requirements, the decision to have or not have surgery is the patient's alone. If the patient does not complete the program, however, the proposing surgeon and the hospital are subject to disallowance of their claims. Emergency admittance for any of the eight procedures exempts patients from program participation.

The Medical Division of the Massachusetts Department of Public Welfare (DPW) has contracted with the state's five health care foundations (HCFs) to administer the CPES. The program was implemented in each of the foundations over a 14 month period beginning in March 1977, utilizing two models. In the "hands-on" model, used in three of the foundations, persons proposed for any elective CPES procedure have an appointment with a foundation-assigned consultant, or, in some cases, are waved from the consultation requirement because of medical necessity. In the "desk audit" model, used in two foundations, medical criteria are used to screen cases, and only if the criteria are not met does the foundation notify the patient of a need for a second opinion.

In September 1978, the Health Care Financing Administration (HCFA) awarded the Massachusetts Department of Public Welfare (DPW) a grant to conduct a study of the state's second opinion program. The terms of the federal grant require a determination of program impact on the amount of surgery performed and the program's cost effectiveness.

This document is the final report of the project performing this analysis of the second opinion program. The remainder of this chapter contains a brief discussion of the policy issues related to second opinion programs, an overview of the objectives and research design of the study, and a description of the remaining chapters of the report.

A. Statement of the Problem

Over the past several years, purchasers of health care have become increasingly interested in cost containment activities that promise to check the rapidly escalating costs of health care. Since evidence points specifically to hospital costs as the largest contributor to America's $162 billion annual health bill, they have become a primary target of containment efforts seeking to limit both price increases in services and their unnecessary utilization (Gibson & Fisher/1978).

Surgery-related costs, an important component of hospital exenditures, were estimated as over $28 billion for 1977 (U.S. House of Representatives/1978). The rate of all surgical procedures increased by 27.5 percent between 1971 and 1977, from 78.1 per 1,000 population to 99.7 per 1,000. Increases in the volume of surgery have been correlated with changes in financing (increased public and private health insurance coverage), increases in the number of physicians and increased accessibility to medical care (SOSSUS/1975; Perrott/1971). Significant variations in surgery rates between and within states have also been documented and attributed to a variety of factors, including the supply of surgeons (Wennberg & Gittelson/1973; SOSSUS/1975); disease incidence (SOSSUS/1975; NCHS/1975); number of beds (Lewis/1969); characteristics of the delivery system (Bunker/1975; Vayda/1973; CHIC/1974) and the financing arrangements/payment mechanisms (Vayda/1973; Gittelsohn & Wennberg/1977; Perrott/1971) Gaus, Cooper & Herschman/1976).

Both the increased incidence of surgery and large variations in surgery rates have raised questions regarding the impact of more surgery on costs and quality of care. Concern with these issues, coupled with a belief that elective surgery is a feasible target for a cost containment effort, have contributed to the growth of second opinion programs.

Such programs either require or encourage patients to obtain an opinion from a second surgeon prior to undergoing an elective surgical procedure, under the assumption that some patients will decide against surgery based on information received from a consultant. Program advocates have described these programs as consumer-oriented and designed to screen those elective operations which could be deferred or prevented without jeopardizing the general health and well-being' of the patient (McCarthy & Finkel/1978).

Various representatives of the medical profession have voiced opposition to organized second opinion programs. The most recent statement by the American College of Surgeons described second opinion programs as being of unknown value, and criticized programs that denied or reduced coverage based on a negative opinion or that discouraged a lack of open communication between the proposing surgeon and the surgeon rendering the second opinion (American College of Surgeons/1979).

Much of the underlying resistance of physicians, particularly surgeons, to second opinion programs is the implication that the rate of nonconfirmed surgeries reported by these programs reflects unnecessary surgery. Establishing a definition of and setting parameters on the extent of unnecessary surgery have proven very difficult. Issues involved in such a discussion include the total costs and benefits of surgery to the individual and the community, the efficacy of the procedure (the probability of curing or alleviating the underlying diagnosis), and the "safe surgery dilemma" described by Mosteller (1978), whereby more people are operated on for less severe symptoms to minimize the total number of deaths.

Given the problems in defining unnecessary surgery and the differences in interpreting the meaning of nonconfirmations for surgery (differences of opinion versus statements of necessity for surgery), the use of nonconfirmation rates from an SOP to measure/proxy the incidence of unnecessary surgery is problematical.

Much of the controversy over the interpretation of nonconfirmation rates as evidence of unnecessary surgery has centered on the SOP studies of Dr. Eugene McCarthy and his colleagues at the Cornell Medical Center. The data reported by McCarthy and his colleagues originated from several mandatory and voluntary SOPs covering 600,000 people in various security welfare plans in the greater New York City area. In a series of articles beginning in 1974, Dr. McCarthy has presented statistics on the referral volume, consultation outcomes, and surgery status of both mandatory and voluntary SOP participants. In the most recent article (1978), McCarthy and Finkel report an overall nonconfirmation rate of 18.5 percent for the 5025 consultations provided in the mandatory program since 1972. They also report that 67.7 percent of those not confirmed did not have the proposed surgery. Of the patients interviewed, 79.4 percent reported that they did not have the operation because the second opinion consultant advised against it.

McCarthy and colleagues maintain that SOPs reduce the level of surgery through a sentinel effect, whereby the very existence of a program limits the amount of surgery proposed and through a direct program effect derived from the reduced possibility of a patient opting for the orginal surgery after receiving a nonconfirmation.

In recent articles, McCarthy and Finkel have referred to the volume of nonconfirmed cases forgoing surgery as indicating "surplus" rather than unnecessary surgery. Those individuals (116 in the mandatory group) who were not confirmed and who neither had the operation nor received any medical treatment by the first and second follow-up visits represent surplus surgery for McCarthy and Finkel, who question the initial recommendation for the procedure (McCarthy & Finkel/1978).

B. Objectives and Scope of the Analysis of the Massachusetts CPES

The Health Care Financing Administration's (HCFA's) objectives in funding the analysis of CPES were to determine whether a mandatory second opinion program for Medicaid patients decreased surgery rates and was cost effective. DPW, while sharing HCFA's goals, also wanted more detailed information on program operations, to make the program's administration as efficient as possible. The research design addresses the interests of both DPW and HCFA. The terms of the federal grant establish the minimum required scope of work; the 13 month schedule and the budget limited the scope of additional analysis.

The study provides an overview of CPES statewide, with special attention given to the Bay State and Central Massachusetts regions, which implemented CPES in 1977. The specific research questions that were addressed are:

1. Have the rates of surgery for the 8 procedures covered by the CPES declined following program implementation?
    a. Has program impact differed among the procedures?
    b. Is program impact accounted for primarily by a sentinel effect or attributable to participants who do not have surgery as a direct result of the program?

   c. Are there differences in the impact of the program among the five HCF regions in the state?

   d. Are there differences in program impact between the two HCF regions using the desk-audit model and the three HCF regions using the hands-on consultation model?

   e. Is the likelihood of surgery being performed related to the outcome of the second opinion consultations?

2. Is the Massachusetts mandatory CPES program cost effective?

   a. Is the program cost effective statewide?

   b. Does the cost effectiveness of the program vary by region?

   c. Does the cost effectiveness of the program differ by procedure (available only for the two regions under special study)?

   d. How could the program be modified to make it more cost effective?

C. Overview of the Project Research Design

The project used two distinct approaches to assess the impact of the Massachusetts second opinion program on the volume of surgery and any consequent savings to Medicaid. The first involved an analysis of surgery rates before and after program implementation; the second involved a study of 2501 persons referred to the CPES program, including their program disposition and surgery decision.

The analysis of surgery rates was undertaken to assess the overall program effect on the level of CPES procedures for the population covered by the program. A detailed description of the methodology is provided in Chapter V; the following presents a brief overview. Monthly surgery rates for the CPES population were developed using the Medicaid billing system. Monthly rates were used in order to have sufficient data points to estimate pre-CPES levels of surgery, to analyze whether there were any trends in pre-CPES surgery, and to consider seasonal variations in surgery rates. For each procedure in each HCF, 44 months of data were calculated, from May 1975, the earliest point at which surgical codes were fully implemented on the billing system, to December 1978, the last month with a complete surgery count, given project deadlines.

The surgery rates were analyzed using an interrupted time series design. This approach looks for a statistically significant change (or interruption) in the pattern of surgery rates following implementation of CPES. Such a change in surgery rates is considered circumstantial evidence of CPES impact. If a change was detected, two types of plausible rival hypotheses which might have accounted for the change were considered: one, that it might have been simply the artifact of a gradual decline in the rates during the observation period, and, two, that the change was the result of a factor (or factors) occurring concurrently with CPES implementation but not connected directly to it.

For Bay State and Central Mass., the possibility of these plausible rival hypotheses were evaluated using as a nonequivalent control group those HCF areas that had not yet implemented the program, and by examining the pattern of surgery rates for evidence of declining trends prior to program implementation. Other rival hypotheses were pursued by investigating changing factors in the state's environment that might have affected surgery rates at the same time as the CPES.

The analysis of surgery rates provided an estimate of the monthly decline in surgery rates after CPES implementation and a determination of whether the change was statistically significant. Each procedure in each region was analyzed individually. There were two separate groupings of findings, one that included those procedures where there was most evidence of CPES impact (minimum estimate) and one that included the above procedures plus those where there was some, but less, evidence of CPES impact (maximum estimate). The three regions (Western Mass., Southeastern Mass., and Charles River) where there was less than 12 months of post-CPES data were only considered in the maximum estimate.

Based on the monthly changes in surgery rates for those procedures where there was evidence of CPES impact, the annual number of forgone surgeries attributable to CPES were calculated. These estimates of the number of forgone surgeries were translated into estimates of program savings using information on the expected cost of each type of surgery in each region, adjusting for costs of alternative treatment, as described below in Chapter III, Section C.

The second approach involved a detailed analysis of CPES statistics including a surgery follow-up of 2501 referrals to Bay State and Central Mass. HCFs. These two regions were selected for an in-depth analysis because their 1977 implementation dates allowed for longer follow-up to determine whether the patients referred to these areas had the originally proposed surgery. The study focused on one full year of program participants in each area. The first two months of program data in each area were not used, since the foundations did not operate at normal program capacity at start-up. Therefore, the study periods were:

Bay State - 1 May 1977 through 30 April 1978;
Central Mass. - 1 October 1977 through 30 September 1978.

Information collected on each referral included patient characteristics, program disposition (confirmation, nonconfirmation, cancellation, special consideration) and what, if any, surgery took place. This information was abstracted from patient intake forms, consultant reports, bills maintained at the HCFs, and the Medicaid billing system. Given the proximity of the project's December 1978 cut-off date to the close of the study periods, not all referrals were tracked a full 12 months. The number of referrals and the corresponding follow-up period (from the referral date to 31 December 1978) were approximately:

12 months or more - 1476 patients (59%)

6 months to 11 months - 902 patients (36%)

3 months to 5 months - 123 patients (5%).

This analysis of Bay State and Central Mass. referrals focused on the relationship between patient and program characteristics and the surgery decision.

Such an analysis highlights which groups of persons referred to a second opinion program may decide against surgery as a result of the program. Various estimates of forgone surgeries attributed to the program are made and assigned savings values less costs of alternative treatment.

Use of both the surgery rate and program participant approaches provides information on both the overall effect of the CPES on surgery rates and its direct effect on program participants. However, the different assumptions underlying each approach result in varying perspectives on the program's effect on the level of surgery and the consequent savings. Therefore, minimum and maximum estimates from both approaches are made of the number of forgone surgeries associated with CPES implementation and operation. Then, a best single estimate is drawn from four estimates, detailing the magnitude of forgone surgeries resulting from the CPES and the consequent savings to Medicaid. These estimates are presented and the underlying approaches discussed in Chapter V.

Users of this report should recognize that the scope of analysis is limited in the following ways:

1. There was less than two full years of post-program data available for the analysis.
2. Program costs and savings are considered strictly from Medicaid's perspective.
3. A lack of detailed clinical data on patient conditions and inexact information on consultant reports make it difficult to extrapolate the extent of unnecessary surgery from the information on confirmed and nonconfirmed cases. This, along with the previously described problems in defining unnecessary surgery have led to a decision not to directly address this issue in the discussions of study findings.*
4. Quality of care effects of CPES have not been assessed.

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* While the most frequent reason cited for a nonconfirmation was "not medically ecessary," the second opinion consultants do not usually describe why they judge procedure as not medically necessary - whether it is an inappropriate recom-endation for the underlying problem, or whether the procedure should be onsidered a last alternative option after less extensive or diagnostic surgery s performed, or after alternative medical treatments have been exhausted. ome confirmations were also observed to be based not on medical necessity but n the patient's strong preference for the proposed surgery.

The following chapter describes the history of the CPES, several characteristics of the five HCF regions, how the CPES operates under the two different models, and concludes with a presentation of the volume and program disposition of referrals to the Western, Southeastern and Charles River areas.

Chapter III focuses on development of the project's data base, primarily the data sources and methods used to calculate the surgery rates, to collect information on program referrals in Bay State and Central Mass., and to construct the cost/savings analysis. Chapter IV presents the findings on 2501 patients referred to Bay State and Central Mass., including their surgery status. Chapter V includes the research design and findings of the surgery rate analysis. The findings relevant to the CPES impact on the level of surgery from Chapters IV and V are summarized in Chapter VI, highlighting evidence of a direct program effect and any sentinel effect. Chapter VII presents the findings of the cost savings analysis based on various estimates of CPES-induced forgone surgeries. Finally, Chapter VIII presents the project's conclusions about the Massachusetts program and offers recommendations for the design of future second opinion programs.

CHAPTER II. DESCRIPTION OF THE CONSULTATION PROGRAM FOR ELECTIVE SURGERY

A. History

The Consultation Program for Elective Surgery (CPES) was initiated by the Massachusetts legislature. The enabling legislation was passed in July 1976, as an outside section to the budget. It reads in its entirety:

> The Department of Public Welfare shall require a second medical opinion in all elective medical care as a precondition to reimbursement for such care.

This wide-ranging mandate was expressive of the legislators' concern over the rapid rise in Medicaid expenditures and a suspicion that an undetermined but significant amount of unnecessary medical care was provided to this population. There were no public hearings nor any definition of what might constitute unnecessary care.

The immediate reaction to this legislation was similar for both the state welfare department's medical division and the Massachusetts Medical Society; both felt that requiring second opinions on such routine matters as office visits, outpatient visits and nursing home care would result, not in cut costs, but in a doubling of physician fees. In the ensuing discussion, the legislative leaders agreed to restrict the requirement for a second opinion solely to elective surgery, the area in which cost containment would most likely be achieved.

The design and implementation of a workable SOP was left to the Department of Public Welfare (DPW). The department was faced with three contraints in its formulation of a feasible program. First, there was a resource restriction: there was money available to fund the program through an outside contractor or contractors, but there were no additional Medicaid staff to allow DPW to administer the program itself. Second, organized medicine in the state was opposed to the legislation, on the grounds that it would interfere with the patient-physician relationship. And, third, federal Medicaid regulations instruct that Medicaid services not be arbitrarily denied or reduced on the basis of diagnosis or procedure, and that care be furnished promptly. A precedent had already been established in New York State, where federal court had struck down an SOP for Medicaid patients that would deny payment if the consultant did not confirm the need for the proposed surgery. Apart from court cases, violation of these mandates could jeopardize the state's claim to matching federal funds.

In order to both minimize physician hostility and make best use of limited funds, the department decided to examine a number of elective procedures to identify those where a reduction would yield greatest payoff in terms of the volume of operations performed, the costs per procedure, and the expected nonconfirmation rate, based on reports of Dr. McCarthy and his colleagues on the programs in New York City. At the same time, in order to meet the federal guidelines regarding arbitrary denial of service, the department devised a program that was mandatory only in the sense that reimbursement for these procedures would be contingent solely on completing the program, not on physician decisions resulting from it. The choice to have or not have surgery after program completion was left to the patient, and the providers would be reimbursed in full if the patient elected the surgery, regardless of the consultant's ruling.

After consultation with both the Massachusetts Medical Society and the American College of Surgeons, the Medical Division proposed seven major policy decisions, encompassing a second opinion program which, it hoped, would prove cost effective, meet federal regulations, and be acceptable to providers. Stated briefly, these were:

1. The program was restricted to eight elective surgical procedures where reasonable cost effectiveness was expected.
2. Medicaid would not reimburse providers not complying with the second opinion requirement, an enforcement mechanism to ensure that all providers participated in the program.

3. The program would be nonbinding, leaving the final decision to have or not have surgery to the patient, thus relieving any potential threat of malpractice claims against consultants and putting the program into compliance with federal regulations regarding equal access to care.

4. Surgeons and consultants would not know each other's identity, thereby insuring independent and objective consultations.

5. No consultant or consultant associate could perform the surgery for which they provided the consultation, thus removing any potential incentives for the consultant to confirm the surgery.

6. Any board certified or board eligible physician could qualify as a consultant, thereby allowing participation of non-Medicaid providers.

7. Reimbursement to consultants would be tied to the Medicaid physician fee schedule.

The proposed program was designed to meet two objectives:

- reduction of Medicaid's expenditures on surgical services;
- provision to Medicaid recipients of qualified and independent judgement concerning the necessity of their proposed surgery.

Expenditures on surgery were expected to decrease because of an anticipated reduction in surgery rates. It was assumed that the level of surgery among the Medicaid enrollees would be reduced through:

1. the direct effect of the program (i.e., some persons participating in the program would decide against surgery because of information received through their consultation regarding the proposed surgery);

2. the existence of a mandatory peer review program (surgeons would propose surgery less frequently because of the program's existence - the "sentinel effect" described by McCarthy in his SOP studies).

While these policy decisions were being developed, the department was also attempting to solve the problems surrounding the administration of the program. Although some considerations pointed to retaining these administrative duties within the department, in order to provide greater control over program operations, decision making and standards, in the end, both financial and political factors brought the decision to find an independent administrator.

At the time, the most promising candidates were the state's health care foundations (HCF), whose boundaries were coterminous with the state's

Professional Standards Review Organizations (PSROs). These five foundations had been established to provide peer review functions for public and private organizations. The department felt that the foundations possessed three advantages to function as SOP referral centers: they had established their credibility with providers; had experience in utilization review; and each foundation covered a specific geographic area, and was thus familiar with the distribution of surgeons within its boundaries. A final and not inconsiderable advantage to the health care foundations (HCFs) was that the choice would defuse previous PSRO objections to the program, since the HCF and PSRO organizations shared the same executive director.

Once the HCFs were identified as the most promising administrators of the second opinion program, individual negotiations were initiated with each. Fixed budgets were appended to the contracts to compensate the HCFs for personnel and indirect costs related to administration of the program. Because of these separate negotiations, each of the foundations began implementing the SOP in their area at different dates, as listed below:

- Bay State HCF - March 1977;
- Central Massachusetts HCF - August 1977;
- Western Massachusetts HCF - February 1978;
- Charles River HCF - May 1978, and
- Southeastern Massachusetts HCF - May 1978.

The department originally intended each of the five foundations to utilize the same administrative structure, the "hands-on model," which required physician examination of the patients. The department felt that not only would different structures lead to difficulties in overall administration and comparability, and thus possibly weakening or confusing standards and criteria, and therefore accountability, but, also, they might prove contrary to federal law, which calls for statewide uniformity in administration of Medicaid regulations. However, local resistance and time pressures resulted in two forms of administrative structure: the "hands-on" model, used in three of the HCFs, and the "desk audit" model (where patients are prescreened using criteria established by the HCFs, in conjunction with the department) in the other two. Both of these models will be explained fully in the program description in Section C, below. First, however, Section B presents a description of the health care foundation regions.

B. Background on the Health Care Foundation Regions

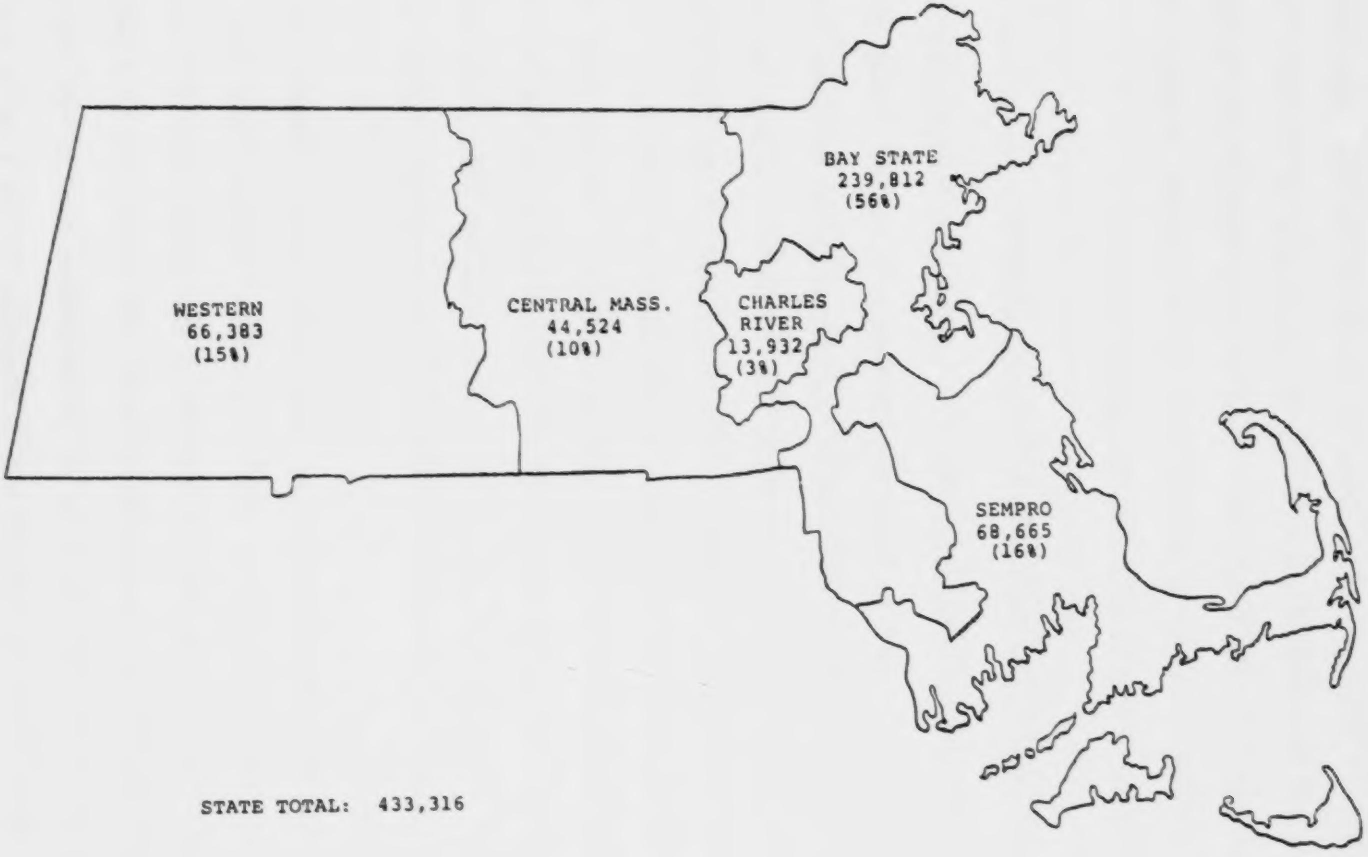
The regions covered by the five health care foundations vary in size, population density, and in their pre-CPES surgery rates. A map of the state indicating the boundaries and CPES-eligible population of these regions is presented in Exhibit I. The three areas using the "hands-on" model: Bay State, Charles River, and Central Massachusetts, cover 69 percent of the CPES population. Bay State HCF, which serves the greater Boston area, is responsible for 55.3 percent of the CPES population statewide (239,812 people). Central Mass. HCF, headquartered in Worcester, serves the central portion of the state and the 44,524 CPES-eligible population there (10.3 of the state total). Charles River, the smallest HCF, covers only 3.2 percent of the CPES population (13,932 persons), living in the suburbs west of Boston.

The two HCFs utilizing the "desk audit" model, Western and Southeastern Mass., cover 31 percent of the CPES population. Western Mass. HCF, centered in West Springfield, covers the western portion of the state, with 15.3 percent (66,383) of the CPES population. Southeastern Mass. HCF serves the 15.8 percent of the CPES population (68,665) who live in the southeast part of the state and Cape Cod.

While there are significant differences in the size of the CPES population served by the foundations, the age and sex distribution of the CPES eligible population is consistent across regions (see Table 1). In all regions approximately 66 percent of the population is under 21, and 92 percent of the

EXHIBIT I

AVERAGE MONTHLY NUMBER OF MEDICAID RECIPIENTS ELIGIBLE FOR CPES IN MARCH 1978, BY MASSACHUSETTS PSRO/HEALTH CARE FOUNDATION REGIONS


WESTERN
66,383
(15%)
CENTRAL MASS.
44,524
(10%)
CHARLES
RIVER
13,932
(3%)
BAY STATE
239,812
(56%)
SEMPRO
68,665
(16%)

STATE TOTAL: 433,316

Source: Massachusetts Department of Public Welfare, Monthly Summary of Expenditures Report

Table 1

AGE AND SEX DISTRIBUTION OF CPES-ELIGIBLE POPULATION BY HCF
(1978)

Age and Sex	Western		Central		Charles River		Bay State		Southeastern	
	#	%	#	%	#	%	#	%	#	%
21 or less	45,079	66.6	29,930	66.2	9,577	65.3	160,821	67.3	46,685	66.5
Female	22,540	50.0	14,965	50.0	4,789	50.0	80,412	50.0	23,343	50.0
Male	22,539	50.0	14,965	50.0	4,788	50.0	80,409	50.0	23,342	50.0
21 or more	22,594	33.4	15,253	33.8	5,086	34.7	78,001	32.7	23,483	33.5
Female	20,694	91.6	14,167	92.9	4,621	90.9	72,332	92.7	21,855	91.3
Male	1,900	8.4	1,086	7.1	465	9.1	5,669	7.3	1,628	6.9
All Ages	67,673	100.0	45,183	100.0	14,663	100.0	238,822	100.0	70,168	100.0
Female	43,234	63.9	29,132	64.5	9,410	64.2	152,744	64.0	45,198	64.4
Male	24,439	36.1	16,051	35.5	5,253	35.8	86,078	36.0	24,970	35.6

population over 21 is female.*

In 1976, however, there were significant variations in the surgery rates among HCF areas for the eight CPES procedures. (These 1976 rates are illustrated in Table 2 .) Bay State HCF had by far the lowest rates for all procedures combined, 95/10,000 population, compared to rates of 145/10,000 in Charles River, 173/10,000 in Central Mass., 198/10,000 in Southeastern Mass., and 209/10,000 in Western Mass.** Much of this difference was accounted for by the T&A rates in Bay State which were two to three times lower than in any of the other areas. These variations in surgery rates were one factor that influenced DPW's decision on which procedures to include in the CPES program.

While resource constraints prohibited a detailed analysis of factors that might contribute to the variation in surgery rates, one indicator, the number of hospital beds, which has been correlated with variation in rates (Lewis/69), is presented in Table 3 . Western and Southeastern Mass., which had the highest CPES surgery rates in 1976, had the fewest number of beds per capita. This finding is in apparent conflict with reports of other researchers who found higher surgery rates positively correlated with bed supply. It is impossible to determine from these figures, however, the relative availability of beds to the CPES population. Future evaluations of the CPES should explore which factors are correlated with observed differences in surgery rates and monitor changes in these factors over the period in which the CPES was operating.

The following section describes the administrative model of CPES used in each of the HCF areas.

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* Estimation techniques used to construct this profile are described in Chapter III, Section A.

** Methods for calculating these surgery rates are described in Chapter III, Section A.

Table 2

SURGERY RATES PER 10,000 CPES POPULATION FOR THE FIVE MASSACHUSETTS HEALTH CARE FOUNDATIONS - 1976

Foundations

Surgical Procedure	Western MA HCF	Central MA HCF	Charles River HCF	Bay State HCF	Southeastern HCF	Statewide Totals
	'76 pop. 66,760	'76 pop. 45,434	'76 pop. 15,009	'76 pop. 245,378	'76 pop. 70,504	'76 pop. 443,085
T&A	130.5	91.6	74.6	42.1	109.1	72.3
Hem	7.2	5.5	4.7	3.1	4.1	4.2
Chol	15.1	19.6	10.7	11.4	18.2	13.9
Meni	2.5	4.4	1.3	3.8	5.0	3.8
SMR	8.7	19.6	14.0	4.2	18.6	9.1
VV	4.8	5.1	5.3	3.9	5.2	4.4
Hyst.	34.5	18.5	25.3	20.6	32.9	24.6
Disc/SF	5.8	9.0	8.7	5.6	5.1	6.0
TOTALS	209.1	173.2	144.6	94.8	198.1	138.2

Table 3

HOSPITAL BEDS BY PSRO (1976)

PSRO	Facilities	Beds*	
		No.	Per 1000 Pop.
Western MA	16	3,847	57.6
Central MA	16	3,036	66.6
Charles River	7	1,627	108.4
Bay State	64	14,464	58.9
Southeastern MA	15	3,106	44.1

Average Monthly 1976 Population Figures

Western MA.	66,760
Central MA.	45,434
Charles River	15,009
Bay State	245,378
Southeastern	70,504
TOTAL	443,085

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* from American Hospital Association, *American Hospital Association Guide to the Health Care Field*, Chicago, AHA, 1977.

C. Administration of the CPES

1. Role of the Health Care Foundations. By spring 1978, the Massachusetts Department of Public Welfare (DPW) had contracts with all the five health care foundations (HCFs) to act as the regional referral centers for the CPES. The administrative duties of the foundations are as follows:

1. Select and recruit a panel of physicians to render second opinion consultations. The state contract stipulated that consultants be either board certified or eligible in the appropriate specialty, or else the HCF would be responsible for developing an approval mechanism that assured their quality. In fact, the vast majority of consultants used were either board certified or board eligible.
2. Develop medical criteria. In the two HCFs where the desk audit model is used, physician panels were established to develop criteria ("objective indications for surgery") for each of the designated procedures. Substantial revisions of the criteria were made by the department's medical consultants.
3. Arrange Consultations. For all patients referred to an HCF using the hands-on model that are not given special consideration and for all cases not meeting the criteria in the foundations using desk audits, the foundation is responsible for collecting and maintaining all medical documentation, scheduling consultations, reviewing the consultant report and informing all parties (surgeon, patient and hospital) of the consultation outcome.*
4. Reimburse the Consultants. The consultants submit their bills directly to the foundation and are paid by the foundation. In turn, the HCF is reimbursed by the state for fixed costs plus fees paid to consultants on a monthly basis.
5. Respond to patient/physician inquiries about the CPES.
6. Report regularly to DPW. The HCFs are required to provide the department with monthly reports detailing the consultation outcome(s) of the referrals.

Each of the health care foundations are sister organizations to a federal PSRO program sharing the same geographical boundaries and executive director. Both the HCFs and PSROs are governed by a board of directors, although some individuals are members on both boards. The health care foundations also manage the peer review programs for Blue Shield and the Department of Public Welfare, and all are at some stage of development of a health maintenance organization (HMO). Most of the HCFs use the same staff to administer both the peer review and second opinion program, with the exception of Southeastern Mass. HCF, which coordinates the CPES with their PSRO program.

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*If it grants the patient a special consideration (a waiver), the referral center is also responsible for discussing the need for the waiver with the proposing physician and collecting and reviewing the documentation which supports the reasons for request.

The administrative structure of each HCF is briefly outlined below in two groups, according to which administrative structure, desk audit or hands-on model, is utilized.

a. The Hands-On Model. Three foundations use the hands-on model, Bay State, Charles River, and Central Mass. In this model, any patient not waived from the requirement to receive a consultation based on medical necessity or travel hardship (i.e., not granted a special consideration) is referred to a consultant for examination and evaluation.

Bay State HCF's SOP program is managed by two R.N.s, one the associate director of the peer review program, the other its coordinator, along with two secretaries. In Central Mass., the program is managed by an R.N. and one secretary. In Charles River, the smallest foundation, daily operations are handled by an administrative assistant and a part-time secretary, with the executive director (an M.D.) available to make decisions requiring medical judgments.

The progressive series of steps patients follow as they proceed through the program are detailed as follows:

a. Notification by proposing surgeon. The process is initiated when a surgeon notifies the foundation that s/he has proposed a Medicaid patient for a CPES procedure. The foundation then prepares an intake form on the patient, which includes identifiers for both the patient and proposing surgeon. The surgeon is asked to forward documentation indicating reasons for the proposed surgery to the foundation.

b(i) Special consideration is granted. The surgeon may request a special consideration based on medical necessity (e.g., patient is in severe pain or has a diagnosis of cancer in situ) which waives the requirement for a second opinion consultation. The R.N. responsible for CPES (or, in the case of Charles River, the executive director (an M.D.))decides if the request is justified. A patient may also request a special consideration based on travel hardship in keeping an appointment with a consultant (defined as requiring travel of 15 to 20 miles). If the special consideration is granted, the patient, proposing surgeon and proposed hospital are notified and the surgeon and hospital are requested to forward documentation to the HCF for retrospective review.

b(ii) Appointment is made with the consultant. Once the appointment is set up with the consultant, the patient is notified of the date. The physician documentation (if any) is sent to the consultant, along with the necessary forms. (At Charles River, the patient volume is low enough to allow the patient him/herself to indicate a convenient time before the appointment is made.)

c(i) Consultation takes place. The consultant examines the patient and reviews any documentation to render an opinion as to whether or not s/he recommends the proposed surgery. The consultant then returns to the foundation the consultation form with the decision and comments (if any), and the billing forms. Letters are sent by the foundation to the patient, physician and hospital, detailing the results of the consultation, explaining special recommendations, if any. If the consultant confirms the need for surgery, the patient's part in the process is complete. If the surgery's need is not confirmed, the foundation notifies the patient, proposing surgeon and hospital that a second consultation is necessary if the patient wants to proceed with the surgery (step e).

c(ii) Patient Misses Appointment. If the patient misses the consultation, another is scheduled (unless the patient cancels out of the program). The procedure outlined in step b(ii) reoccurs until the patient either shows up at an appointment or cancels out.

d(i) Foundation completes records on consult. If patient is approved for surgery the patient file is completed and filed. The state billing form is completed and sent to the state on a monthly basis. When payment is received from the state, the consultant is issued a check and payment is documented.

d(ii) Foundation completes records on special consideration. The state requires a retrospective review on special considerations, to confirm their necessity, when they result from medical reasons (as opposed to travel hardship). Documentation (when sent) from the hospital/physician is reviewed and the file is closed.

e Second Consultation. If the patient receives a nonconfirmation on the first consultation and still wishes to have the operation, a second consultation is required (and, once completed, whether confirmed or not, the patient may proceed as s/he wish). The procedure for the second consult is the same as b(i), but with a different consultant.

A simplified flow chart of this process appears in Exhibit II.

b. Desk Audit Model. Two foundations use the desk audit model, Southeastern Mass. and Western Mass. In this model, a check-list screening mechanism is used to eliminate all cases where surgery is considered justifiable; all other receive a consultation. At Western Mass. HCF, the program is managed by an R.N. coordinator. The coordinator screens all incoming cases; those requiring a personal consultation are given appointments by a secretary. At Southeastern Mass. HCF, the PSRO utilization review coordinator at the hospital where the surgery is to be performed conducts the screening process. In cases where a consultation is required, the patient is referred to the HCF. The program there is managed by the director of program planning and a medical secretary.

The basic steps followed in the two desk audit regions (Western and Southeastern Mass. HCFs) are similar but the personnel used in the process differ, as is outlined below:

a. Complete criteria check-off form. Surgeons proposing one of the designated procedures must complete a procedure-specific "criteria check-off form" (see Appendix 1) indicating which criteria for surgery apply to a particular patient.

  - In Western Mass. HCF, surgeons forward this directly to the HCF;

  - In Southeastern Mass. HCF, the surgeon forwards the form to the PSRO utilization coordinator at the hospital where the surgeon proposes to perform the surgery.

b. Criteria screened. In Western Mass., the R.N. coordinator at the HCF determines if the appropriate criteria are met:

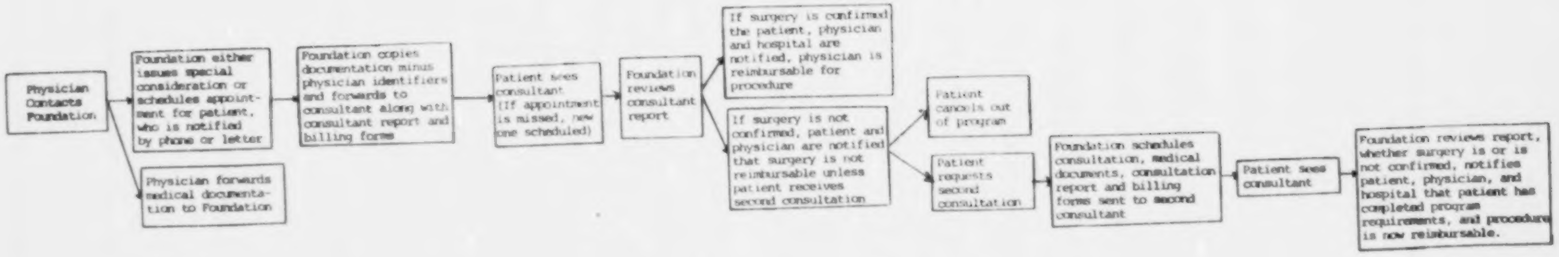
  - if the criteria are met, the coordinator so notifies the patient, proposing surgeon and proposed hospital;

  - if the criteria are not met, the coordinator notifies the patient that if s/he desires the surgery, an appointment for a consultation with a consultant is necessary. Cases having a second consultation are processed in manner similar to the steps used in the hands-on model

In Southeastern Mass., the utilization review coordinator reviews the information on the check-off form to determine if appropriate criteria are met:

Exhibit II

SIMPLIFIED FLOW CHART OF PATIENT REFERRAL PROCESS IN FOUNDATIONS USING HANDS-ON MODEL


Physician Contacts Foundation
Foundation either issues special consideration or schedules appointment for patient, who is notified by phone or letter
Physician forwards medical documentation to Foundation
Foundation copies documentation minus physician identifiers and forwards to consultant along with consultant report and billing forms
Patient sees consultant (If appointment is missed, new one scheduled)
Foundation reviews consultant report
If surgery is confirmed the patient, physician and hospital are notified, physician is reimbursable for procedure
If surgery is not confirmed, patient and physician are notified that surgery is not reimbursable unless patient receives second consultation
Patient cancels out of program
Patient requests second consultation
Foundation schedules consultation, medical documents, consultation report and billing forms sent to second consultant
Patient sees consultant
Foundation reviews report, whether surgery is or is not confirmed, notifies patient, physician, and hospital that patient has completed program requirements, and procedure is now reimbursable.

- if the criteria are met, the coordinator forwards the form to the HCF and notifies the physician and hospital admitting office that the surgery has been approved.
- if the criteria are not met, the check-off form is sent to the HCF and the foundation notifies the patient and proposing surgeon that a consultation is necessary prior to the surgery. The HCF then arranges an appointment with the patient (if requested) using a process similar to that in the hands-on consultation process.

Program requirements are met and the surgery is reimbursable in both desk audit programs if 1) the criteria are met; 2) where criteria are not met, the first consultant confirms the need for surgery; or 3) where criteria are not met and the first consultant does not confirm the need for surgery, where the patient obtains a second consultation.

For each of the two foundations utilizing the desk audit, the department requires that an audit be conducted quarterly on ten percent of every surgeon's second opinion surgery check-off forms on cases determined to have met the criteria. This audit involves obtaining from the surgeon documentation which substantiates the criteria checked on the check-off form. There is a provision in the contracts which requires the HCF to notify the department of any physician who cannot supply proper documentation for this audit. Any surgeon not complying with this requirement must refer all cases for a consultation.

2. Role of the Medical Division, Department of Public Welfare. The department's initial role was to design the program and to provide for the establishment of the referral centers that would arrange for the consultations. Other major responsibilities during the early stages of program development and implementation included:

- assisting the foundations in development of criteria for the desk audit model;
- developing policy regulations;
- revising physician billing procedures;

- notifying physicians and recipients of the requirements of the program; and
- responding to physician and patient inquiries.

Once the program was operational statewide, the department's ongoing role included monitoring the foundation contracts, deciding which recipients (by category of assistance) were to be covered under the program, and how to handle requests for travel waivers and other cases entailing special circumstances, where there were no established guidelines. Among the other responsibilities of the department are:

- preparation of the annual budget;
- review of the health care foundations' monthly referral reports and preparation of their monthly invoices;
- provision of program information to state and federal agencies; and
- the design and development of enforcement mechanisms.

Most of these activities and those described below are the responsibility of the CPES director.

Based on the ongoing supervision and review of the program, the department identified three program aspects that required action:

- Evaluation of the SOP. When the department initially developed the program, no formal evaluation plan was included in the design. Since this program was one of the few existing programs of its type in the country, and since approximately 2,500 patients were referred to the program during the first year, the department felt that an evaluation would permit reasonable conclusions to be made about the program's effectiveness. Therefore, the department submitted a proposal for such an evaluation to DHEW's Health Care Financing Administration in March 1978, receiving the grant that supported preparation of this report.

- Enforcement of Regulations. The department has not enforced program regulations disallowing claims for noncomplying providers. Attempts were made to establish a payment edit on the current Medicaid claims processing system, but due to limitations of the system and impending implementation of the Medicaid Management and Information System (MMIS), this problem has not been pursued. Over the past six months, the department has developed an edit system which will disallow claims if the program requirements are not met. The system will become operational under the department's MMIS in the summer of 1980.

- Administrative Costs and Administrative Structure. The department negotiated the administrative costs paid to the HCFs based on the expected number of referrals times a fixed rate ranging between $38 and $45.* Based on actual administrative costs per referral, the department felt that these costs were too high. High unit costs plus a department decision to have a unified program model (the hands-on type) motivated the department to issue a request for proposal (RFP) in order to establish a more centralized structure and to achieve greater economies of scale. The department expects to award this contract in the spring of 1980.

D. Characteristics of CPES Consultants

Individual foundations were responsible for recruiting qualified physicians to participate as consultants. Table 4 presents the number of physicians recruited and the number and characteristics of physicians used as consultants for each foundation.

A total of 1235 physicians signed agreements to participate as CPES consultants statewide. This translates into 28.5 recruited consultants per 1,000 Medicaid recipients required to participate in CPES. The consultant/population ratio varied from 13 : 1,000 in Southeastern Mass. to 58 : 1,000 in Charles River.

Fewer than half of the physicians recruited actually rendered a second opinion consultation during the first 12 months in each site. Charles River, covering the smallest eligible Medicaid population, utilized 80 percent of the recruited physicians as consultants, while Bay State, covering the largest eligible population, used only 37 percent of their recruited physicians. Ninety-six percent of the physicians who rendered second opinions were surgeons; 96 percent of the surgeons were board certified (of the 25 remaining physicians, 13 were board eligible and 12 of unknown board status).

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* One of the foundation's fixed costs exceed this rate.

Table 4

CHARACTERISTICS OF CPES CONSULTANTS BY FOUNDATION, 1977-1978

Foundations	Number of Consultants Recruited	Number of Consultants Recruited Per 1,000 CPES Population	Number of Consultants Used During First Year	Percent of Consultants Used Who Are Surgeons	Percent of Consultants Used Who Are Board-Certified*
Western MA	180	27.1	125 (69.4%)	90.4%	96%
Central MA	166	37.3	81 (48.8%)	98.8%	84%
Charles River	81	58.1	65 (80.2%)	100.0%	92%
Bay State	717	29.9	270 (37.7%)	97.4%	97%
Southeastern MA	91	13.3	36 (39.6%)	100.0%	97%
TOTAL	1235	28.5	577 (46.7%)	96.5%	96%

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* Half of the remaining physicians were board-eligible.

E. Program Disposition of Patients Referred to the Western, Southeastern and Charles River HCFs

A total of 4864 persons proposed for CPES procedures were referred to the HCFs during the first year of CPES operations in each area. The 2501 referrals to the Bay State and Central Mass. HCFs are described in detail in the following chapter. The following discussion provides some basic program statistics on the patients referred to the three HCFs that were not studied in depth.

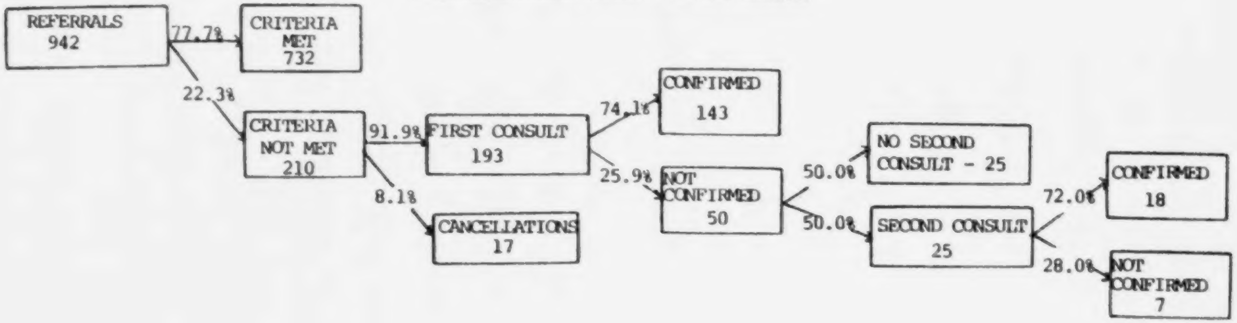
1. Western and Southeastern Massachusetts HCFs. Both Western and Southeastern Mass. HCFs employ the desk audit CPES model. Exhibit III depicts the program disposition of patients referred to these areas.

Western Mass. received requests for 942 confirmations of surgery (referrals) for cases proposed for CPES surgery between 1 March 1978 and 30 April 1979. Fifty-one percent of the cases were proposed for T&As, 22 percent for hysterectomies, 10 percent for cholecystectomies, and 9 percent for submucous resections, with fewer

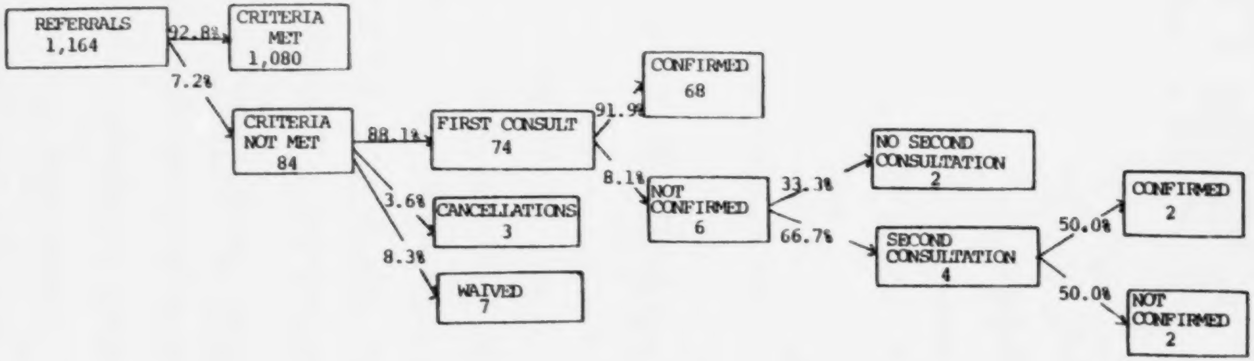
Exhibit III

PROGRAM DISPOSITIONS OF ALL PATIENTS REFERRED TO WESTERN MASS. AND SOUTHEASTERN MASS. HCFs

Western Massachusetts HCF
All Procedures - March 78 to April 79


REFERRALS 942
77.7%
CRITERIA MET 732
22.3%
CRITERIA NOT MET 210
91.9%
FIRST CONSULT 193
8.1%
CANCELLATIONS 17
74.1%
CONFIRMED 143
25.9%
NOT CONFIRMED 50
50.0%
NO SECOND CONSULT - 25
50.0%
SECOND CONSULT 25
72.0%
CONFIRMED 18
28.0%
NOT CONFIRMED 7

Southeastern Massachusetts HCF
All Procedures - May 78 to April 79


REFERRALS 1,164
92.8%
CRITERIA MET 1,080
7.2%
CRITERIA NOT MET 84
88.1%
FIRST CONSULT 74
3.6%
CANCELLATIONS 3
8.3%
WAIVED 7
91.9%
CONFIRMED 68
8.1%
NOT CONFIRMED 6
33.3%
NO SECOND CONSULTATION 2
66.7%
SECOND CONSULTATION 4
50.0%
CONFIRMED 2
50.0%
NOT CONFIRMED 2

than 31 individuals proposed for each of the remaining four procedures (see Appendix 2 for a breakdown of referrals and their disposition by procedure).

Over three-quarters of the cases (77.7 percent) met the criteria established by Western Mass. Of the 210 cases where criteria were not met, 92 percent proceeded to have a second opinion with a foundation-assigned consultant, and 74 percent of the cases having a consultation were confirmed for surgery. Half of the cases (25) not confirmed went on for another consultation, and 72 percent of these were confirmed for surgery by the second consultant. The groups most likely to be deterred from CPES surgery (those not meeting the criteria who do not have a second opinion, those not confirmed by the first consultant, and those not confirmed by two consultants) totaled 49 (45 percent for T&As and 37 percent for hysterectomies).

In Southeastern Massachusetts, 93 percent of the 1164 referred cases met the criteria. Over half of the patients referred were proposed for T&As (52%), 19 percent for submucous resections, 14 percent for hysterectomies, and 9 percent for cholecystectomies, with fewer than 35 cases each proposed for menisectomies, varicose vein excision, disc/spinal fusion or hemorrhoidectomy (see Appendix 3).

Eighty-eight percent of the 84 patients not meeting the criteria had a consultation (74 persons) and an additional 8 percent (7) were waived from receiving a consultation because of travel hardship. All but six cases (8.1 percent) were approved by the first consultant and there were only 4 second consultations, two of which were confirmed.

Given the number of referrals that meet the criteria, it appears that there is little or no direct program effect in either of these areas, particularly in Southeastern Mass., where over 90 percent of all referrals meet the criteria. The department initially expected that less than half the referrals would meet the criteria, given that the surgery rates in both these areas were substantially higher than Bay State for such procedures as T&As and hysterectomies.

The percentage of cases meeting the criteria may indicate that the specific criteria being used are not stringent enough. Stricter criteria can translate into more consultations, as is illustrated in Western Mass. Following a revision of criteria for T&As in November 1978, the percentage of referrals in Western Mass. requiring a consultation increased from 5 to 29 percent over six months. Whether having these additional cases receive a consultation resulted in fewer patients having surgery is unknown at this time. Chapters V and VI present the total effect of the CPES in Western and Southeastern Mass. HCFs on the covered surgical procedures.

2. Charles River HCF. Two hundred and fifty-seven patients proposed for CPES procedures were referred to this HCF, which employs a hands-on model. Sixty percent (152) of the patients were referred for T&As, 14 percent for hysterectomies, and 9 percent each for cholecystectomies and submucous resections (See Appendix 4).

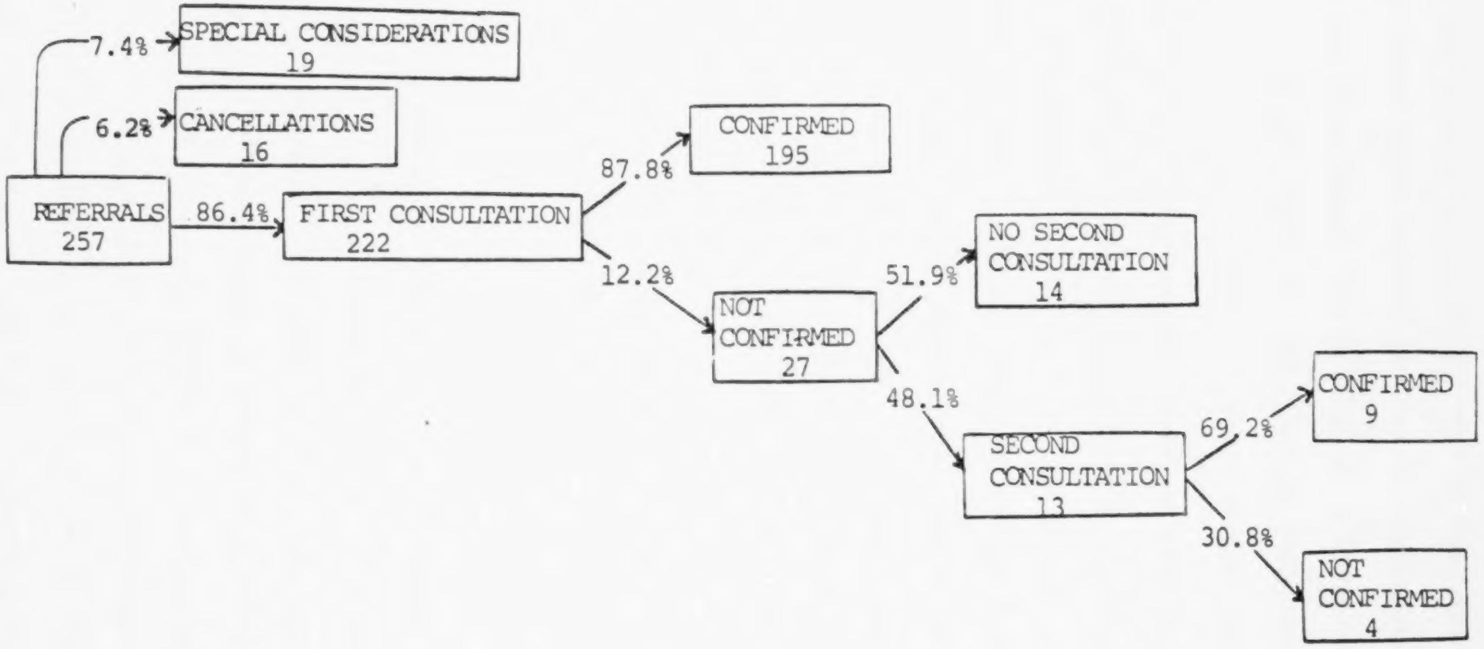
The basic program dispositions of persons referred to Charles River are illustrated in Exhibit IV. Eighty-six percent of the patients referred have a second opinion consultation and 88 percent are confirmed by the consultant. Of the 27 cases not confirmed, 14 had no second consultation, 9 were confirmed by the second consultant and 4 were not confirmed.

The percentage of cases with various program outcomes is similar to the other two areas that use the hands-on model. The impact of the CPES for surgery rates within the Charles River area is described in Chapters V and VI.

The following chapter presents program and surgery dispositions for patients referred to Bay State and Central Massachusetts Health Care Foundations.

EXHIBIT IV.

PROGRAM DISPOSITIONS OF PATIENTS REFERRED TO CHARLES RIVER HCF FOR ALL PROCEDURES
(1 May 1978 - 30 April 1979)


7.4%
SPECIAL CONSIDERATIONS
19
6.2%
CANCELLATIONS
16
REFERRALS
257
86.4%
FIRST CONSULTATION
222
87.8%
CONFIRMED
195
12.2%
NOT CONFIRMED
27
51.9%
NO SECOND CONSULTATION
14
48.1%
SECOND CONSULTATION
13
69.2%
CONFIRMED
9
30.8%
NOT CONFIRMED
4

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CHAPTER III. DEVELOPMENT OF THE PROJECT'S DATA BASE

The decision to use two distinct approaches to examine the impact of the CPES on the surgery rates of the eligible Medicaid population established stringent data requirements for the project. The analysis of surgery rates required development of monthly surgery rates for the eligible CPES population for each procedure in each HCF region for a forty-four month period. The data sources and processes used to calculate these surgery rates are discussed in Section A. (Methods used to interpret the impact of CPES in the surgery rates are discussed in Chapter IV, Section A).

The analysis of CPES operations in the Bay State and Central Mass. regions involved development of a data base on 2501 program referrals over a one-year period in each site. The compilation of this information involved collection of program data on each case at the foundations (described in Section B-1), and tracking each case through the Medicaid billing system to determine whether the proposed surgery took place (described in Section B-2).

The final part of this chapter, Section C, presents the methods and data sources used for calculation of the costs and savings of the CPES.

A. Calculation of Surgery Rates

Assessment of the overall effect of CPES on the level of surgery for the Medicaid population covered by the program required development of surgery rates for a period spanning CPES implementation. The earliest point that the computerized Medicaid billing system began systematically to include surgical procedure codes on physician bills was May 1975, 22 months before CPES implementation in the first HCF region, Bay State. Because of the limited pre-CPES time period for information on the number of surgeries, project staff decided to develop monthly surgery rates. These would provide a sufficient number of data points to estimate levels of pre-CPES surgery, to analyze whether any pre-CPES surgery trends occurred, and to examine any seasonal variations in surgery rates. The last available month of data was December 1978, the latest time for which the billings system would include complete claims, given the project deadlines. For this 44 month period, surgery rates per 100,000 population were calculated for each procedure in each of the five foundation regions.

The general approach used to calculate these rates was to identify the groups within the Medicaid population that are required to participate in the CPES, to distribute this population among the HCFs, to count the total number of CPES operations performed on this population over the study period, and to calculate the appropriate surgery rates.

The following section describes the data sources and methods used to calculate these surgery rates.

1. Population Data. The first step in the calculation of CPES surgery rates for each HCF region was to identify which Medicaid recipients are required to participate in the CPES. As stated previously, CPFS requirements do not apply to recipients with dual coverage (Medicare or other insurance) or individuals who do not have inpatient benefits (the general relief and food stamp population). Also excluded are recipients enrolled in health maintenance organizations (HMOs). The data source selected had to include recipient counts by month, by category of assistance (to allow exclusion of individuals with dual coverage), and with sufficiently small geographic subdivisions to permit allocation of the CPES eligible population to the five HCF regions.

The source for population figures selected by the project was DPW's monthly summary expenditure reports (MSERs). These reports, generated from the welfare recipient system, include individuals applying for cash and medical assistance by individual welfare service office (WSO) and category of assistance.*

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*Time constraints and accessing problems ruled out computer analysis of DPW's master file.

The Department of Public Welfare groups recipients of cash and/or medical benefits into ten categories of assistance:

00 - Refugees

01 - SSI-A (Aged)

02 - Aid to Families with Dependent Children (AFDC)

03 - SSI-D (Disabled)

04 - General Relief

05 - Medical Assistance--Old Age Assistance

06 - Medical Assistance--AFDC

07 - Medical Assistance--Disabled

08 - Medical Assistance--Under 21

09 - Food Stamps.

Categories of assistance where dual coverage is extensive cover the elderly and disabled. Although the exact proportion of individuals with dual coverage within categories was unavailable, between 70 and 90 percent of the individuals in categories 01, 03 and 05 were estimated to have dual coverage. On this basis, all individuals in these categories were excluded from both the population figures and the calculation of number of surgeries. Categories of assistance not eligible for inpatient benefits (04 and 09) were also excluded.

Of the population covered by the CPES, 82 percent fall within the AFDC category (02). Of the CPES population, 66 percent are under 21, and 92 percent of those over 21 are female. (A demographic profile of the eligible population is included on page 17.)

The second step required a regrouping of the CPES population from welfare regions into HCF/PSRO regions. The state is organized into six regions comprised of 100 welfare service offices (WSOs). Since the CPES program is administered through the five HCF/PSRO areas, which are not contiguous with the welfare regions, these data had to be regrouped accordingly. Therefore, project staff manually transcribed counts of individuals in relevant assitance categories in each WSO from the MSERs by month (from May 1975 through December 1978). These figures were then regrouped into relevant HCF/PSRO regions.

WSO directories from 1974, 1976 and 1977 were used to determine which towns were within a WSO, and the towns within the WSO boundaries were compared with those in the HCFs. There were 89 WSOs coterminous with HCF regions, with 11 WSOs split between two HCFs.* The Medicaid population of these 11 WSOs was broken out by Zip code and assigned to an HCF.** Six of the split WSOs had 97 percent or more of their entire population contained in only one of the HCF regions for the entire study period, and were therefore assigned to the HCF holding the majority population. The monthly population of the remaining five WSOs was distributed between the appropriate HCFs based on analysis of the population by Zip code. The same percentages used to distribute the population of these five WSOs were applied in assigning the number of CPES operations to an HCF.

An adjustment was made to eliminate Medicaid recipients enrolled in health maintenance organizations (HMOs). These individuals are included in the MSERs, but are not required to participate in CPES.*** HMO enrollees were excluded from the population using lists of the number of monthly enrollees by category of assistance, and the Zip codes covered by each of the four HMOs that enroll Medicaid recipients.*

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* In June 1977, a reorganization of WSOs (including some elimination and consolidation) took place. Since those WSOs split prior to this date did not involve heavily populated areas, it was decided to consider only those split after the reorganization.

** To determine if there was any significant variances over time in the populations by Zip code within a WSO, eight points in time were examined in six month intervals over the study period (April and December for 1975, and June and December for 1976, 1977, and 1978). No significant variance in the population was found.

*** Four HMOs enroll Medicaid recipients: Harvard Community Health Plan; North Quabin Health Plan; Valley Health Plan; and Fallon Community Health Plan. Fallon Community Health Plan is eliminated from our data, since they began enrolling recipients in 1979.

a. Limitations of the Population Data. The population data used in the analysis do not exactly correspond to the number of individuals required to participate in the CPES program. Problems in obtaining a more accurate account involved incompleteness of available information on the number of individuals with dual coverage, the existence of some groups who cannot be accurately assigned to any one HCF, and lag time in adjusting for new and closed cases in the MSER.

1. Project staff excluded all individuals in categories where more than 70 (and up to 90) percent of the individuals were estimated as having dual coverage. Therefore, those individuals in these categories who do not have dual entitlement and are thus required to participate in the CPES are excluded (the aged without medical assistance or SSI and the disabled without SSI). All individuals in the Medical Assistance-Disabled category were included, although an estimated 40 percent of the individuals in this category have dual coverage. Therefore, some individuals not required to participate are included in the CPES population. In one year of program operation in Bay State and Central Mass., 187 (7 percent of all referrals) were from categories of assistance excluded in the population count, but it is unknown how many of these did not actually have dual coverage and were therefore referred appropriately.

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* Monthly figures include patients in assistance categories 01, 02, and 03, with only category 02 being relevant to the study. Using figures supplied by DPW, 3.5 persons were assigned as the average AFDC (category 02) family size in metropolitan Boston, and 3.2 persons for the rest of the state. Then, the number of individuals within the AFDC category was calculated and subtracted from the monthly HCF regional totals. The one exception to this procedure involved Harvard Community Health Plan, between May 1975 and October 1977, when the number of enrollees was not specified by category of assistance. For this one time, 96 percent of the HMO Medicaid population was estimated as being in category 02.

2. The population figures exclude a small number of individuals eligible for the CPES but who are grouped into WSOs or a welfare region not contained in the MSER and who could not be allocated to an HCF region. These include persons whose eligibility for medical assistance is assigned by the Commonwealth's Division of Youth Services or the Department of Mental Health, and foster care children (assigned to welfare region 9). Based on the project's review of referrals to the Bay State and Central Mass. HCFs, the number of individuals within these groups that participated in the program was minimal (under 3 percent of all referrals).

3) The MSER is not corrected to reflect the first month of actual eligibility for cases that become eligible for Medicaid retroactively, and thereby underestimate the actual population at risk during a given month. Nor does the MSER exclude a case until it has been closed for six months, which may result in some overestimation of the population at risk. Although the Medicaid population is fluid, with individual people entering and exiting frequently, the average Medicaid case is open for three years, and it is not expected that the above problems bias the population figures used for the 44 month period under study.

These three problems do not result in any serious under or overestimation of the CPES population, because many of the problems result in offsetting effects (an overestimate counters an underestimate). The analysis of pre- and post-CPES surgery rates is not biased by these problems because the number of operations included in the numerator correspond only to the population groups included in the denominator.

Two other limitations of the population figures relate to their reflection of the population at risk. First, the population figures were not corrected to exclude individuals no longer at risk because of nonrepetitive surgery, such as a hysterectomy or cholecystectomy. This adjustment would have required assumptions about the length of time an individual remains a Medicaid recipient, and would have required separate population counts for each procedure (i.e., a hysterectomy would result in reducing the population at risk for hysterectomy but would not affect the population at risk for other procedures).

The second shortcoming relates to the limited amount of demographic information which restricted calculation of age and sex specific surgery rates. Estimates of the portion of the CPES population under and over 21 years of age and the sex distribution presented in Table 1 were based on the profile of each category of assistance as described in Appendix 5.*

In general, project staff believe that the population figures used in the caculation of surgery rates are a close approximate of the total population eligible for CPES.

2. Number of CPES Operations. Following identification of those groups of Medicaid recipients required to participate in CPES, it was necessary to obtain an unduplicated count of CPES operations performed on these recipients between May 1975 and December 1978. These counts of surgery were grouped by month of service and assigned to an HCF region, based on the patient's WSO, to allow calculations of CPES surgery rates.

The source for the surgery count was the Medicaid provider claims history files (i.e., billing data). All physician claims (excluding anaesthesiologist claims) with a procedure code covered by CPES relating to a patient in a category of assistance included in the population count were transfered to a master CPES claims tape (27,149 claims). Before claims could be assigned to the appropriate HCF region and month, duplicate claims for the same operation and claims with disallowance codes indicating that the patient was ineligible for Medicaid had to be eliminated.

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* Based on population profiles developed for January '76, '77, and '78, there were no major shifts in the age and sex distribution of the population, over the 44-month period in any HCF region.

Claims for ineligible recipients were identified from disallowance codes that indicated: the cardholder number not on the master recipient files; the dependent suffix not included in the cardholder's family on the master recipient file; or the cardholder ineligible on the date of service. Such claims were eliminated.

Following this step, the files were sorted by individual cardholder number and date of service to establish criteria to screen out duplicate claims. There were four types of duplicate claims identified: claims for the same date and same procedure; claims for nonrepetitive operations; claims for two operations where one procedure code was appropriate, and claims coded as CPES surgeries that were in fact follow-up visits.

Claims were immediately eliminated where a disallowance code specified a duplicate invoice: claims by the same provider for the same patient, procedure code, and date of service.

Next, criteria were established to identify duplicate billings of nonrepetitive (i.e., one-time) procedures. Three CPES procedures normally occur only once in an individual's lifetime: tonsillectomy/adenoidectomy, cholecystectomy, and hysterectomy. If multiple claims were found for the same individual for one of these procedures, the claim for the first date of service was saved, and subsequent claims disregarded.*

Although the other five CPES procedures could be performed more than once on an individual, it was necessary to distinguish between valid and duplicate claims. A program was developed to flag claims for the same individual and procedure code/procedure group code with dates of service less than six days apart. These claims were reviewed manually to determine which were legitimate:

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* If a claim was found for an adenoidectomy and a later claim for a tonsillectomy/adenoidectomy, the second claim was allowed only if a year had passed between the two claims (there is no unique code for tonsillectomy).

1. For varicose vein operations, criteria were established to permit successive operations a day apart where it appeared that separate legs were operated on at different days during the same hospital stay.
2. For spinal fusion/disc surgeries, where two unique procedures are frequently performed during the same operative session by two different surgeons (excision of disc and a spinal fusion, for example), the procedures were considered as one operation when the patient was anaesthetized only once.
3. If there were claims for a rhinoplasty and septorhinoplasty for the same patient on the same date of service, the most inclusive procedure code (e.g., septorhinoplasty versus rhinoplasty) was saved.
4. If two procedures from two different CPES categories occurred in the same operative session, such as tonsillectomy/adenoidectomy and a submucus resection, both procedures were counted (there were less than ten such instances).

Other multiple claims involving the same cardholder and provider were found with dates of service occurring in one week intervals. Examination revealed these as follow-up office visits. (Such visits should not receive a CPES procedure code, but are sometimes miscoded.) To adjust for this situation, all claims equal to or less than $20 were eliminated, since the least expensive CPES procedure, incision of hemorrhoids, is billed at $25 or more.

Finally, there was the problem of identifying and retaining claims disallowed because of technicalities. The project's objective was to identify CPES operations that were performed, regardless of whether payment was made, unless the patient was ineligible. Claims were reviewed manually to include legitimate surgeries where bills were submitted but disallowed because of various technicalities (e.g., claims denied payment because of a six month lapse between service date and date of claim receipt, and claims disallowed because they were not coded appropriately as to whether the procedure was done on an elective or emergency basis). In some cases, two claims were found with the dates of service changed or another claim resubmitted. Only the first claim was retained.

Claims for CPES operations performed on foster care children were excluded because foster care children were excluded from the population count, since they could not be assigned to an HCF region. Examination of claims with an 09 region (foster care) indicated that some were not assigned the usual dependent suffixes, but instead a suffix denoting an adult head of household.* These claims were reviewed to separate procedures performed on adults from those performed on foster care children. Those performed on foster care children were removed from the monthly totals; those performed on adults were checked against the recipient files for addresses to assign them to HCF regions and add them to the monthly procedure group totals.

No adjustment was necessary for HMO enrollees, since their individual surgery claims were not included in the provider files used as a data source.

Once ineligible, invalid and duplicate claims had been screened from the master CPES master file, the claims were sorted into WSOs by month and procedure, and monthly totals were assigned to the HCF regions. The same WSO list used in assigning population estimates was applied here. For the five WSOs split between HCF regions, a program was created that assigned monthly claims to the proper HCF region using the same percentages calculated to distribute their population figures.

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* DPW programmers explained that cases with adult head of household suffixes in region 9 (that assigned to all foster care children) were dummy files, standing either for an adult or foster child, and were assigned where legitimate claims were filed, but the proper claim numbers could not be determined.

The original master CPES claims tape contained 27,149 claims. Only 20,523 claims were included as unique operations during the May 1975 - December 1978 time frame. Exhibit V describes the number of claims eliminated at various points in the process. Most of the programming screens were developed based on manual review of the claims sorted by individual cardholders.

a. Limitations of the Count of CPES Operations. The project staff is confident that the final count of operations by month represents the best available count from the paid claims system. However, there are some questions of the completeness of the provider claims system itself.

The first limitation is that there should be no physician bill for surgeries performed by resident physicians if there is no attending physician, as the salary of residents is included in the hospital per diem rate. Inquiries to several major Boston teaching hospitals revealed that in most institutions, claims would be submitted by an attending Medicaid provider. There is, however, some possibility that the Medicaid paid claims files do not reflect the total number of CPES procedures performed on the eligible population.

The extent of this problem was highlighted by an investigation of claims records of the 2501 individuals proposed for CPES surgeries in the study sample from Bay State and Central Mass. HCFs. A total of 161 individuals in the sample proposed for surgery had no claims submitted in their names for that procedure but did have unexplained hospitalization within six months after the referral to the foundation.* Review of hospital records showed 77 cases (almost half of the 161) where a CPES surgery was performed but no claim was made for reimbursement. Most of the CPES surgeries not included on the physician paid claims system were from two teaching institutions where it is likely that residents performed the surgery.

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* A six month time span was chosen for review since after that period an individual is required to have another CPES review before having surgery, even if it was previously approved.

Exhibit V

NUMBER OF CLAIMS SCREENED TO OBTAIN AN ACCURATE COUNT OF CPES PROCEDURES FROM MAY 1975 TO DECEMBER 1978

First Run

Total Input of Physician Claims with a CPES Procedure Code from 1975-1978		27,149
- claims for ineligible patients	2,111	
- claims prior to 1 May 1975	1,482	
- claims after 31 December 1978	1	
- claims under $20	173	
Total claims eliminated		-3,767
		23,382

Second Run

Total Input From First Run		23,382
- duplicates from same date of service	2,521	
- adenoid claims when submitted with T&A claims	102	
- multiple claims for nose surgeries	38	
Total claims eliminated		-2,661
		20,721

Third Run

Total Input From Second Run	20,721
- 198 claims involving multiple procedure codes for the same operation (applies for hysterectomies, cholecystectomies, T&As and nose surgeries)	-198
	20,523

These 20,523 claims were then sorted into HCF regions by the eight covered procedure categories.

Numerous conversations with hospital, DPW and foundation staff indicated to project staff that there were no changes in resident billing practices during the 44 month study period. Therefore, while there may be a slight undercounting of surgeries through the period, there is no evidence to indicate that this problem would bias a comparison of pre- and post-surgery rates.

Another concern was whether the final three months (October through December 1978) of the 44-month study period would include all claims for surgery done within those dates of service, given the lag time involved in posting physician bills. The paid claims files were accessed in early June 1979, six months after the December 1978 dates of service. DPW's Office of Management Services reported that 94 percent of physician bills for December 1977 were paid in five months, and that the lag time had decreased since them. Given both this information and the fact that the counts of surgery are based on legitimate claims submitted, regardless of payment, there should be only minimal undercounting of surgeries because of bills not posted by June 1979.

Finally, it must be noted that the counts of CPES operations include all emergency surgeries. Although emergency cases are exempt from CPES participation, it was not possible to eliminate these claims, both because of the questionable accuracy and consistency of the emergency coding, and because differentiation between elective and emergency operations was not coded prior to the fall of 1977.

B. Construction of Profiles of Program Participants

To assess the impact of the CPES on program participants, project staff examined HCF records on all individuals referred to the Bay State and Central Mass. HCFs over a one year period, tracking all cases through the Medicaid billing system to determine if the originally proposed surgery took place. As described in Chapter I, above, these two foundations were selected because they implemented the CPES in 1977, thus allowing longer follow-up on whether the referrals had the surgery. The study periods were:

Bay State - 1 May 1977--30 April 1978; and
Central Mass. - 1 October 1977--30 September 1978.

This section discribes how and what information was collected on the patient referrals to these health care foundations.

1. Data Collection at the Bay State and Central Mass. HCFs - Negotiation for CPES Data. The contracts between the Department of Public Welfare and the health care foundations specify that the foundations are to maintain records on all persons referred to the program. Although DPW does receive monthly reports which contain the names, Medicaid numbers and the program dispositions of all persons referred to the program during the month, a thorough analysis of the program required that project staff have access to the foundations' CPES files.

When the project became operational in November 1978, relations between DPW and the foundations were strained. Bay State, in particular, believed that they were being unfairly excluded from an active role in DPW's analysis of the CPES, because the original grant submitted to the Health Care Financing Administration proposed a joint study of DPW and Bay State HCF. DPW's access to the foundation files was challenged by Bay State, which claimed ownership of the program data.

Several meetings between the foundation and DPW representatives were held to discuss the terms of the federal grant. An outline of the proposed analysis was discussed along with the project's data requirements, and project access to the foundation files negotiated. Finally, Bay State and Central Mass. both agreed to allow project staff access to all requested information, with one exception: Bay State refused to allow project staff to collect information that would permit identification of individual consultants or that would link them with specific patients referred to the program.* Project staff wanted the names of consultants linked to specific patients to identify what diagnostic tests, performed by the consultants, are billed to Medicaid.

a. Data Collection. The data collected on program referrals at Bay State and Central Mass. is included in Exhibit VI. These data were needed to construct program statistics on confirmations, nonconfirmations, special considerations and cancellations for each procedure.

Data sources included patient intake forms, consultation evaluation forms, and consultant bills maintained at the foundations. Information was abstracted on all referred cases for a full 12 months. Bay State and Central Mass. collect similar information on referrals and consultants, differing only in the quality of the forms and record systems.

The problems involved in data collection related to incomplete information recorded and contained in foundation files, and the inconsistency of recorded information and the interpretation of consultation outcomes. The following outlines the most frequent data problems:

a. Incomplete Patient Medicaid Numbers. Accurate numbers were needed to determine if a patient had the proposed surgery, but many of the intake forms from Bay State contained incomplete or inaccurate Medicaid cardholder numbers. Approximately 555 cases from Bay State and 30 cases from Central were checked manually against Medicaid's recipient master file to obtain an accurate cardholder number.

b. Missing Provider Number of Proposing Surgeon. Identification of the proposing surgeon was required to assist in determining whether the patient had surgery and to count the number of surgeons referring patients to the program. About 95 percent of Bay State's intake forms did not contain the proposing surgeon's Medicaid provider number. This information was obtained using the physician's name and address from the foundation file to locate the provider number in DPW's alphabetical listing. (If the proposing surgeon was a

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* Bay State's Executive Director stated that to release such information would violate the spirit of Bay State's agreements with participating consultants.

Exhibit VI

INFORMATION COLLECTED ON PATIENTS REFERRED TO THE BAY STATE AND CENTRAL MASS. HCFs DURING THE STUDY PERIOD

1. Patient Identifiers
2. Patient Age
3. Patient Sex
4. Patient Category of Assistance
5. Referral Date
6. Foundation Identifier
7. Proposed Surgical Procedure
8. Identifiers for Proposing Surgeon
9. Proposed Hospital (only if no Medicaid number for proposing surgeon is available)
10. Consultant Identifier (Central Mass. HCF only)*
11. Documentation Received Before Consultation (YES/NO)*
12. Date of Consultation*
13. Result of Consultation (Confirmed/Not Confirmed)*
14. Reason for Nonconfirmation*
15. Number of No Shows*
16. Amount Billed by Consultant*
17. Diagnostic Tests Done by Consultant (YES/NO)*
18. Code for Diagnostic Tests Done by Consultant*
19. Special Consideration/Waiver Granted (YES/NO)
20. Date Special Consideration Granted
21. Reason Special Consideration Granted
22. Date Documentation on Special Consideration Reviewed (or Received) by HCF staff
23. Date Cancelled Out of Program
24. Reason Cancelled Out of Program
25. Date of Program Completion
26. Type of Surgery, If Any
27. Date of Surgery

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* Same information for second consultation, if applicable.

NOTE: not all items apply to any one referral.

resident and therefore had no Medicaid number, the name of the proposed hospital was obtained and referenced for a Medicaid provider number, using DPW's files.)

c. Incomplete Recording of the Proposed Surgical Procedure. An exact procedure code was needed to allow accurate estimates of savings of forgone surgeries. However, the foundations frequently recorded only a description of the proposed surgery without the Medicaid procedure code. Project staff had to use the written description to supply the procedure code(s), a difficult task, since the description included on the form was not always specific to one code. For example, there are 24 procedure codes for varicose vein surgeries covered under CPES, but the form might only specify "varicose veins." In these cases, a numerical code was assigned to correspond with the written description, and an estimated average cost was assigned for the procedures within that category.

d. Interpretation of Consultation Outcome. Originally, two codes were designated to record the outcome of the consultation: confirmed/approved and not confirmed/denied, with an additional reason code for nonconfirmations. However, to incorporate additional information recorded on the forms, five confirmation and ten nonconfirmation codes were eventually developed (Exhibit VII).* Cases where the consultant confirmed the surgery under specific conditions were of particular interest (e.g., "only if the patient loses weight"). The specific conditions of confirmation were recorded.

e. Specific Information on What Diagnostic Tests Were Ordered. The foundation does not always indicate which diagnostic tests were ordered when indicating that they were ordered. The consultant forms were reviewed to determine the nature of these tests, but often only a general type was requested (hearing test), making it difficult to translate them into diagnostic test codes to estimate patient costs of diagnostic tests.

Once completed, these 2501 forms were keypunched by DPW's consolidated processing unit. Numerous edit checks were built into the keypunching program to validate the information (such as calculating the check digit on cardholder numbers to insure that all digits were correct).

Exhibit VII

REASON CODES FOR CONFIRMATIONS AND NONCONFIRMATIONS

Confirmations

Code	Reason
10	Straight confirmation: no reason.
11	Conditional confirmation: confirmed only if another test/procedure/later evaluation/etc. is (are) done first.
12	Confirmation: with additional recommendations.
13	Confirmation of part of a CPES procedure and denial of part (e.g., confirmation of adenoidectomy but not tonsillectomy).
14	Confirmation of CPES procedure with recommendation of additional non-CPES procedure.
15	Confirmation of proposed CPES procedure with recommendation of additional CPES procedure.

Nonconfirmations

Code	Reason
20	Nonconfirmation: no reason.
21	Nonconfirmation: not medically necessary.
22	Nonconfirmation: insufficient evidence to make a decision.
23	Nonconfirmation: recommends medical management.
24	Nonconfirmation: recommends conservative/nonmedical treatment (e.g., exercise, diet, no smoking).
25	Nonconfirmation: recommends diagnostic testing.
26	Nonconfirmation: recommends reevaluation at later date.
27	Nonconfirmation of one covered SOP and confirmation of another (similar to Confirmation Code 13 above - project staff coded the consultation to reflect the consultant's exact statement).
28	Nonconfirmation of CPES procedure but confirms or recommends a non-CPES procedure.
29	Nonconfirmation: procedure will not improve patient's condition.

2. Tracking Patients for Surgery. The Bay State and Central Mass. HCFs do not routinely collect information on whether patients referred to the CPES have the proposed surgery after completing program requirements. Project staff used three successive methods to determine whether patients had a CPES or related surgery and the date when that surgery took place:

Method 1. The Medicaid numbers of program referrals were compared to the list of Medicaid recipients having CPES surgeries used in calculation of surgery rates.

Method 2. The individual Medicaid claims profiles of all CPES referrals were examined that were not matched for surgery under method 1.

Method 3. The hospital records were reviewed of all individuals found to have had a hospitalization within 6 months of their referral to the foundation where there was no accompanying surgical claim.

The steps followed to implement these methods are described in detail below.

The first step was the development of a sequential computerized list of the Medicaid cardholder numbers of all 2501 referrals. These numbers were then matched against a printout of recipient numbers contained on the 1977-1978 provider paid claims used to calculate the number of CPES procedures for the calculation of the surgery rates. Fifty-nine percent (1466) of the 2501 cases were matched as having a CPES procedure. Project staff recorded the appropriate procedure code and the date of service for these operations. The seventeen cases on which there was no available Medicaid cardholder number were assigned to an "unknown surgery outcome" category.

Individual recipient profiles of medical expenditures from April 1977 through December 1978 were obtained for all 2501 cases. Project staff manually reviewed the profiles of the 1035 cases not matched as having had a CPES procedure against the physician paid claim file, finding approximately 200 more cases where a CPES procedure had been performed. Many of these cases involved persons from categories of assistance not included in the calculation of surgeries because of dual coverage/ineligibility. Several other persons were recorded as having a CPES surgery based on discovery of an anaesthesiologist claim with a CPES procedure code,* where there was no corresponding surgeon claim.

Review of these patient files indicated that many persons referred for a CPES procedure did not have the originally proposed operation, but did have a surgical procedure related to the CPES procedure. Examples of these related surgeries include: D&Cs performed on patients proposed for hysterectomies, myleograms on disc surgery referrals and arthroscopies on menisectomy referrals. Project staff recorded whether a related surgery was performed on a patient when there was no record of a CPES procedure, including the procedure code and date of service.

One further step was taken to ensure that all referrals having a CPES procedure were identified. Based on manual review of recipient profiles, 161 cases were identified in which the patient was hospitalized within 6 months of their CPES referral with either no surgeon's bill posted or a bill posted with the code number for an unidentifiable procedure. The hospital records for these cases were reviewed by nurse auditors from Medicaid to determine if a CPES or related surgery occurred. Hospital records on 115 cases were examined on site; written requests to hospital were sent on 46 cases asking for relevant discharge summaries and operative notes if applicable. Of the 161 cases surveyed, 77 (47.8 percent) were found to have had a CPES procedure, 16 (10.0 percent) had a related procedure, 15 case records (9.3 percent) were unavailable.

This review of hospital records provides some indication of the completeness of the provider paid claim files used in the surgery rate analysis: only 4 percent (77) of the total number of program referrals having had a CPES procedure would have been missed without the hospital review. This 4 percent figure is somewhat overstated since 15.5 percent (n=25) of the 161 cases reviewed were in the dual coverage or ineligible categories excluded from the surgery rate analyses. The completeness of the provider file suggests that there is no serious undercounting of surgery using these billing data.*

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* Anaesthesiologists have a provider type prefix of 42 and are not included on the 01 provider file used to calculate surgery rates.

Information on each patient's surgical experience and the date of surgery, where applicable, were added to the tape of program referrals, thereby completing the profile of program participants. This tape was programmed using the Statistical Package for Social Sciences (SPSS) on the Boston University computer.

There were, however, several additional surgeries discovered in the process of conducting the cost analysis (i.e., patients originally counted as not having surgery upon further review found to have had a CPES or a related surgery). Appropriate adjustments were made manually. A further adjustment was made after an in-depth review of all referrals in categories of assistance with dual coverage/ineligibility. The claim histories of all individuals in these categories were reexamined to investigate whether Medicare was involved in paying a portion of the bills, indicated by a specific code on the billing profile.** If a hospital bill with a Medicare payment code was posted within six months of the patient's referral with no procedure code, it was impossible to rule out the possibility of a CPES procedure having been performed.* The surgery outcome of these referrals was therefore left as "unknown."

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* Originally, project staff were warned by foundation staff that the Medicaid billing system as a source would lead to significant undercounting of surgeries in major Boston teaching hospitals, because of residents performing surgery that would not be billed. Boston City Hospital, in particular, was identified as a problem, but only 6 cases were found in which a CPES referral was hospitalized without a physician bill on file, and only 3 were found to have had a CPES procedure. Cases were checked at 40 hospitals, although only 4 hospitals involved 5 or more cases. Two hospitals, both in Bay State HCF, accounted for 51 of the 77 CPES procedures discovered as a result of the review of hospital records. These institutions do not appear to bill consistently for surgeries done by residents, although there were a significant number of CPES procedures done in these hospitals where there was a physician bill submitted.

** When Medicare is involved in medical services payment, a service type code (hospital or physician bill) appears on the Medicaid billing system, but no procedure code, with a lump sum payment and a code indicating Medicare involvement.

Based on the thoroughness of steps used in determining whether surgery occurred, project staff are confident that the reported figures on surgery outcomes accurately reflect the surgery experience of referrals through December 1978. Staff were consistently conservative in assignment of cases to the no surgery group - even without a specific procedure code indicating surgery, where there was any serious doubt the case was assigned an "unknown" surgery outcome.

a. Patient Follow-Up. Individuals were tracked to determine whether a CPES related surgery occurred through 31 December 1978. Given differences in the referral dates, the length of follow-up (that is, the time between date of referral and end of study period) was not uniform. This could pose a serious methodological problem if a large proportion of referrals occur close to the end of the study period. However, in the present study, length of follow-up was not a serious problem, since less than 5 percent (123 cases out of 2501) of the CPES-referrals in the study had follow-ups less than six months, and none were followed less than three months. Exhibit VIII graphs the referral pattern by month for Bay State and Central Mass. HCFs. Since the last referral study month for Bay State was April 1978, all Bay State cases had at least eight months of follow-up, and 68 percent (1334 out of 1958 referrals) had at least one full year of follow-up.

In Central Mass., all cases had at least three months of follow-up, 26 percent had one full year of follow-up, and only 23 percent had under six months. Furthermore, an analysis of length of time from referral to surgery date in Central Mass. indicates that 92.9 percent of persons having surgery had the procedure within 90 days (3 months) of referral (see Table 5).

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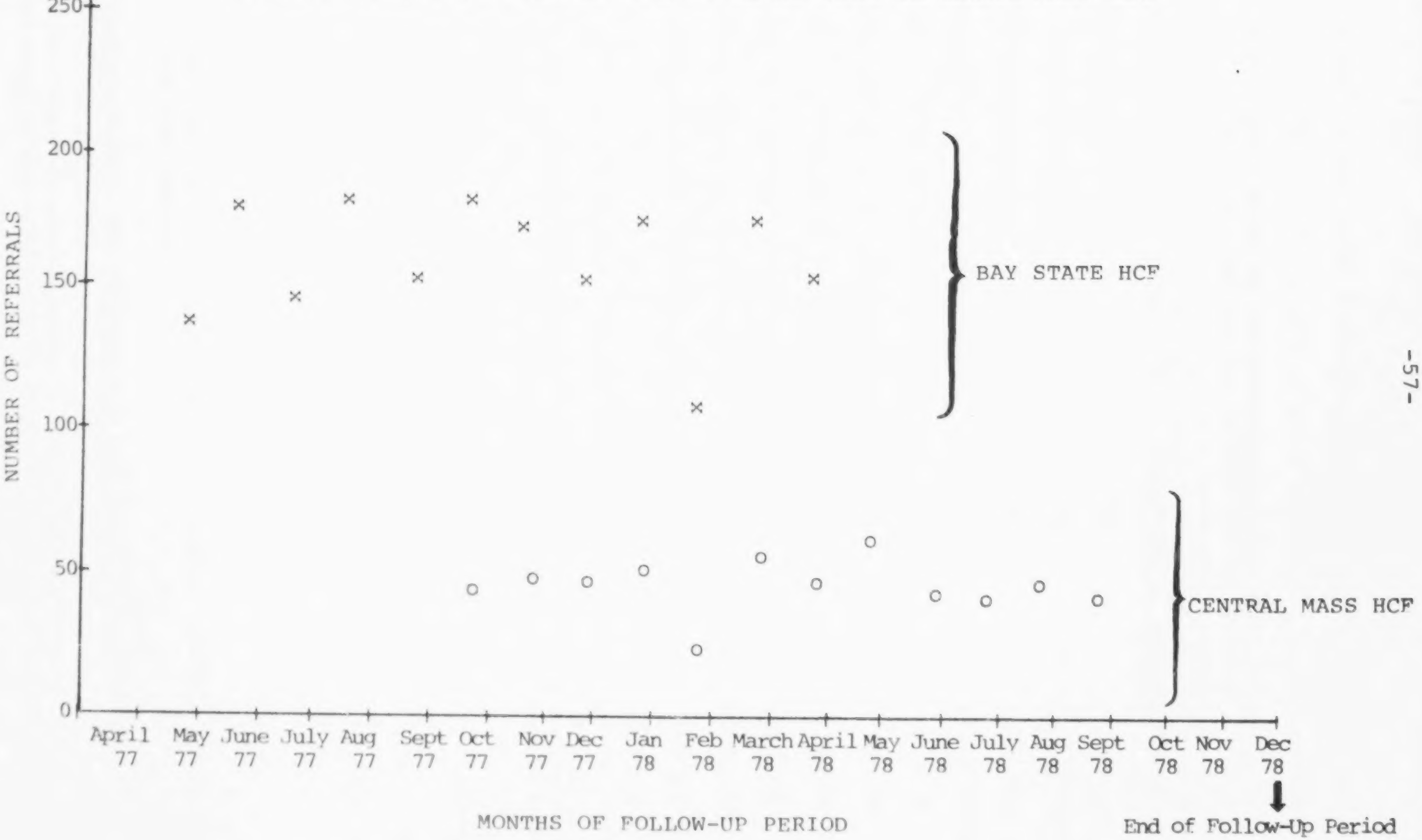
* This analysis was completed too late to review hospital records of these patients.

Exhibit VIII

NUMBER OF PATIENTS REFERRED PER MONTH TO THE BAY STATE AND CENTRAL MASS. HCFs



Note: The low referral volume for February 78 can be attributed to the "Great Blizzard" of '78.

Table 5

DISTRIBUTION OF PERSONS REFERRED TO THE CENTRAL MASS. HCF HAVING SURGERY, BY DAYS BETWEEN REFERRAL AND SURGERY DATES

Days Between Referral Date and Surgery Date	No. of Persons With Surgery	Percent of Persons With Surgery	Cumulative Percent of Persons with Surgery
All	416*	100.0%	-
7 or less	18	4.3%	4.3%
8 - 15	34	8.2%	12.5%
16 - 23	47	11.3%	23.8%
24 - 30	69	16.6%	40.4%
31 - 60	170	40.7%	81.1%
61 - 90	49	11.8%	92.9%
91 - 120	13	3.1%	98.2%
121 - 180	9	2.2%	98.2%
181 - 270	4	1.0%	99.2%
270 or more	3	0.7%	100.0%

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* Does not include 12 unknowns.

A modified life table approach* was contemplated in ascertaining the probability of having a CPES surgery within a one year period. The analysis was carried out for several procedures in Central Mass. (See Appendix 6 for an example.) The life table estimates differed only slightly from estimates obtained without considering the months of follow-up, and, therefore, this approach was abandoned.

In addition, project staff estimated the additional number of surgeries that would have occurred if everyone had been followed for one year. The expected number of surgeries per follow-up for referrals having between 3 and 11 months of follow-up was computed and compared with the total number of expected surgeries in one year, using the probability of surgery within one year to be p = .85.** Table 6 shows that an additional 6.65 "surgeries" would have been noted if a one year follow-up was possible on every case. This represents a difference of only 1.7 percent in the number of surgeries in Central Mass., a further indication that the follow-up in this study is sufficiently complete.

b. Results. The product resulting from the collection of data on program referrals was a profile on each of 2501 cases. The profile, stored on computer tape, includes:

- patient's Medicaid cardholder number (including category of assistance and welfare area);
- proposed procedure code(s);
- foundation receiving referral;
- date of referral;
- patient age and sex;
- Medicaid provider number of proposing surgeon (if missing, proposed hospital number);

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* See Theodore Colton, ScD Statistics in Medicine, Little Brown and Co., Boston, 1974.

** Obtained from life table analysis of T&As in Central Mass. This is probably an overestimation of the probability of surgeries for all procedures.

Table 6

ESTIMATION OF EXPECTED NUMBERS OF SURGERIES IN CENTRAL MASS. HCF WITH ONE YEAR FOLLOW-UP ON ALL CASES

A Months of Follow-Up "X"	B Number of Cases	C Probability of Surgery Within One Year	D Expected No. of Surgeries Within One Year (B) x (C)	E Probability of Surgery Within "X" Months	F Expected No. of Surgeries Within "X" Months (D) x (E)	G No. of Surgeries if followed 12 months (D) - (F)
3	40	.85	34	.929	31.6	2.4
4	43	.85	36.6	.96	35.1	1.5
5	40	.85	34	.98	33.3	0.7
6	43	.85	36.6	.98	35.9	0.7
7	60	.85	51	.99	50.5	0.5
8	47	.85	39.95	.99	39.6	0.35
9	54	.85	45.9	.99	45.4	0.5
10	26	.85	22.1	1.00	22.1	0.0
11	50	.85	42.5	1.00	42.5	0.0
						6.65

- program outcome:
  - if cancelled - reason code and date cancelled;
  - if special consideration - reason code, date granted and whether documentation was received/reviewed;
  - if consultation(s) took place - whether documentation on need for surgery was sent to the consultant, the date of consultation, the outcome of consultation, the number of missed appointments, the amount billed, whether diagnostic tests were ordered, and which diagnostic tests were ordered;
- date of program completion; and
- procedure code of surgery performed and date of operation, if applicable.

C. Cost Analysis

The cost analysis of the CPES program required information on program expenditures, estimates of the Medicaid payments for each CPES procedure, and estimates of the Medicaid payments for alternative medical or surgical treatment. The data sources and estimation techniques for these calculations are described in the following section. As previously indicated, all costs and savings figures will be strictly from Medicaid's perspective.

1. Program Costs. Program costs include:

- DPW's CPES-related administrative costs;
- the fixed price amounts of the five HCF's CPES contracts;
- total amount paid to consultants (not available by procedure on a statewide basis);
- costs of testing done by consultants and paid by Medicaid.

DPW's administrative costs, which include the CPES director's salary and fringe benefits, plus overhead, were available from Medicaid's office manager. These costs were distributed equally among the five foundations for calculation of foundation cost savings ratios.

The fixed price amounts of each foundation contract and the amount paid to consultants in Charles River, Western and Southeastern Mass. HCFs were abstracted from the monthly bills submitted by each foundation to DPW. Payments to Bay State and Central Mass. consultants were collected from the foundation, based on the records of patients receiving consultants during the respective study periods for those HCFs.

Medical payments for diagnostic tests ordered by consultants were estimated based on the costs of tests ordered by Bay State and Central Mass. consultants, adjusted to account for the fact that most consultants do not bill Medicaid for these tests.*

2. Cost Savings. The project analysis includes several estimates of the number of forgone surgeries by procedure attributable to the CPES:

- a statewide estimate of forgone surgeries by foundation in the first 12 months after CPES implementation (the maximum estimate of CPES impact based on the surgery rate analysis, see page 123);**
- a minimum and maximum estimate of forgone surgeries in Bay State and Central Mass. in the first 12 months after CPES implementation, from the surgery rate analysis (see pages 122-123);
- a minimum and maximum estimate of forgone surgeries in Bay State and Central Mass., based on an analysis of 2501 program referrals.

To translate these estimates into cost/saving figures required:

- an estimate of the expected Medicaid payment (savings) associated with each forgone surgery, and
- an estimate of the expected Medicaid payments (costs) related to the possible substitution of medical care or surgical treatment by those individuals not undergoing the CPES procedure.

a) Expected Medicaid Payments for each Forgone Surgery. The expected savings for each forgone surgery were based on the expected Medicaid-reimbursed expenditures for each type of CPES surgery, which include:

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* These costs were expected to be minimal: only 9 percent of the consultations in Bay State and Central Mass. involved any testing, the majority of the tests done were relatively inexpensive (blood counts, Pap smears, and hearing tests), and based on a review of patient billing histories, fewer than half of the tests were billed to Medicaid.

** There is no minimum estimate of statewide savings because there was less than 12 months of post program data in three areas.

- the surgeon(s)' fee(s);
- the anaesthesiologist's fee;
- the per diem hospital charge (by HCF area) times the average length of stay (by HCF area);
- related inhospital costs (X-rays, lab tests, drugs);
- the cost of posthospitalization medical care (e.g., follow-up visits to the surgeon, physical therapy/braces/crutches for knee or back surgery, drugs).

The expected payments for a particular type of forgone surgery, exclusive of hospital charges, were estimated from a review of the paid claims histories of Bay State and Central Mass. patients referred to the program and having CPES surgery. (The sample size of cases by procedure reviewed for this estimate are included in Appendix 7.) Unless a specific billing code indicated otherwise, all X-rays, tests and drugs ordered while the patient was in the hospital for CPES surgery were considered related to the surgery. Drugs ordered within a week of the hospital discharge were also considered surgery-related, as were postoperative office visits made the same surgeon within six months of the surgery.

Following this review, two profiles of costs were constructed for each procedure. A "typical case" profile was developed, based on the assumption that the forgone surgery case would have involved all payments typically associated with that particular surgery. The "pro-rated" profile took into account the fact that not all cases having a given procedure receive the typical array of services, and were thus assigned a portion of payments for a given service based on the actual percentage of cases in the surgery sample that had the service. For example, if the most frequent number of follow-up visits for a hysterectomy case was two visits, the typical profile allows for two visits and the pro-rated method would allow 1.5 visits, if only 75 percent of the surgery cases had any follow-up visits that can be tracked. Both profiles were developed to account for the likelihood of missing some payments related to the surgery that could not be identified, such as follow-up visits to hospital clinics or physicians other than the surgeon of record. A typical and pro-rated profile of all nonhospital costs were calculated for each procedure. A comparison of the typical and pro-rated charges for a hysterectomy case is presented in Exhibit IX. Given that the fee schedule is standard throughout the state, the same figures were used for each HCF area.

The hospital portion of the costs associated with a forgone surgery in each HCF was calculated based on the average HCF hospital per diem charge and the average length of stay for the procedure. As the hospital portion of the surgery costs accounted for between 75 and 85 percent of the total costs, special care was necessary in making these estimates.

In Massachusetts, hospital per diem rates are established by the Rate Setting Commission, and hospitals are reimbursed by Medicaid at their established rate times length of stay. A weighted average per diem hospital rate for each HCF was calculated by using each hospital's per diem rates in effect in 1977 and weighting the rates based on the proportion of acute care days for Medicaid patients accounted for by a hospital relative to the total number of Medicaid acute care days for the HCF region. Weighted per diem rates were multiplied by the average length of stay for each procedure in each HCF to establish an estimate of the expected hospital charge for each forgone surgery.

Two sources were used for the average length of stay associated with each CPES procedure in each HCF. Fiscal year 1977* PSRO data were available on length of stay for each CPES procedure for the Bay State and Western Mass. PSROs. For Charles River, Central Mass., and Southeastern Mass., a pre-PSRO

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* 7/1/77 - 6/30/78.

Exhibit IX

A COMPARISON OF TYPICAL AND PRO-RATED EXPECTED PAYMENTS, EXCLUSIVE OF HOSPITAL CHARGES, FOR A HYSTERECTOMY CASE BASED ON AN ANALYSIS OF 34 CASES FROM BAY STATE AND CENTRAL MASS HCFs*

COST ITEMS	TYPICAL CASE	PRO-RATED CASE
Surgeon's Fee	$280.00	$280.00 (100%)**
Assistant Surgeon's Fee	42.00	17.93 (42%)
Anaesthesiologist's Fee	55.22	55.22 (100%)
X-Rays	7.00	1.23 (17%)
Drugs	11.77	8.65 (73%)
Follow-Up Visits	24.15	9.17 (38%)
Miscellaneous	34.17	2.00 (5.8%)
TOTAL	$454.31	$374.20

NOTE: Typical case includes the standard Medicaid reimbursement for the surgeon, assistant surgeon, and anaesthesiologist, and mean payment for X-rays, drugs, follow-up visits and miscellaneous charges.

Pro-rated case assigns standard surgeon and anaesthesiologist fee plus a portion of typical case payments based on actual percentage of cases reviewed having assistant surgeon and other listed services.

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* The figures presented here are for an abdominal hysterectomy. Separate calculations were made for vaginal hysterectomies based on 16 cases which were approximately $100 more expensive. Forgone hysterectomies were estimated to be 79 percent abdominal and 21 percent vaginal, based on Bay State and Central Mass. HCF referrals having hysterectomies.

** Percent of cases having this service.

data system in Massachusetts, CHAMP,* supplied the length of stay by procedure since no PSRO data were available for these areas. Use of either of these length of stay figures may overstate the length of stay for the CPES population, since the PSRO/CHAMP figures include the elderly and emergency cases, who may have longer lengths of stay.**

The second length of stay figure was based on a review of CPES surgery claims from the Bay State and Central Mass. areas.*** The length of stay figures based on review of CPES referrals were somewhat shorter than the CHAMP or PSRO data, which was expected, given that there were relatively fewer elderly or emergency admissions among the CPES referrals. The advantage of the PSRO and CHAMP figures was that they allow for regional variations.

The two available estimates of length of stay for each procedure in each area were applied to the weighted per diem rate for each region, setting up a minimum and maximum range of hospital costs. These were combined with the profiles of per procedure savings in each HCF (see Appendix 8). The assumption made in both the minimum and maximum estimates was that the surgeon, hospital, and related bills would have been paid had the surgery taken place (in practice, it appears that not all legitimate claims were paid, but there was no available estimate on the extent of nonreimbursement).

a) Related Surgery Costs. The paid claims history files of all 2501 referrals were examined to determine whether the patient had a related surgery within 6 months of referral. Project staff recorded all surgical codes that might be related to the proposed surgeries, and, on cases that had no CPES surgery, cross-referenced the fee schedule to determine if the surgical test was related. Three types of surgery were considered to be related to the CPES operation:

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* 7/1/75 - 6/30/

** It should be noted that most CPES procedures are not frequently performed on elderly patients.

*** When there was a difference in the mean length of stay between Bay State and Central Mass., separate means were calculated and the Central Mass. figures were applied to the other HCF/PSRO regions, since Central Mass. was found to have lengths of stay more similar to the rest of the state than Bay State's, based on CHAMP data.

1. A non-CPES surgery that would have been done in conjuction with a CPES surgery.

   The only example of this was 10 myringotomies done on patients proposed for T&As. These myringotomies were only considered as related surgeries because the cost of a T&A, when done in conjunction with a myringotomy, is less than if the T&A case was considered a separate admission. For those program referrals that forgo the T&A but have a myringotomy within 6 months of the referral, the savings associated with the forgone T&A are considered to be only the marginal costs of a T&A in that situation.

2. A diagnostic surgical procedure related to the proposed surgery.

   Examples in this instance would include a myleogram on a disc case, a diagnostic D&C on a hysterectomy case, or an arthroscopy on a menisectomy case. These surgical operations were considered to be an offset to savings only if the test was an additional test to one that would have been performed had the CPES surgery taken place. This adjustment was necessary to account for the fact that some patients would have these diagnostic procedures prior to their program referral and in those cases the claims for the surgery would not be considered as an offset to savings. Each type of test was considered individually, based on an in-depth review of samples of referrals having and not having the CPES procedure. The exact treatment of individual tests is outlined in Appendix 9.

3. A non-CPES surgical procedure done as an alternative to the CPES procedure.

   An example here would be a therapeutic D&C done instead of a hysterectomy. There are the "true" related surgeries, and all of the costs associated with these procedures were netted out from the savings figures.

The costs for an additional diagnostic surgery and an alternative treatment surgery were calculated in the same manner as the costs of a forgone CPES procedure, based on Bay State and Central Mass. patients having a specific type of related surgery.

b) Medical Treatment Costs. Most of the referrals not having the CPES procedure did not have a related surgery either. It was considered necessary, however, to examine what, if any, Medicaid expenditures were incurred for medical treatment related to the forgone surgery. Accurate identification of such expenditures was extremely difficult, because the Medicaid billing system, the only available source of these data, does not include procedure codes in sufficient detail to determine whether a given visit or prescription was related, for example, to tonsillitis (for a proposed T&A case) or endometriosis (for a proposed hysterectomy case).

The approach that was used to estimate these costs was to compare 6 months of post-referral Medicaid billings for those program participants that had a specific CPES procedure (excluding the direct costs of that surgery) to Medicaid billings for program participants that did not have the CPES or a related surgery.

To test the hypothesis that Medicaid billings for those not having a CPES or related surgery were not significantly different from those having a CPES procedure, samples of equal size were selected from the CPES surgery and no surgery groups for each procedure (see Appendix 10 for sample sizes used).* The paid claims for individuals in each group were tracked for six months from referral, excluding those payments definitely unrelated to the proposed surgery, such as bills from dentists, psychologists, nursing homes, opthamologists/optometrists, podiatrists, OB/GYN practitioners and family planning agencies (except those related to hysterectomies), and those bills with surgical procedure codes unrelated to the proposed surgery.

Six months worth of actual Medicaid payments, excluding the above items, was totalled for each case in the surgery and no surgery samples for each procedure. A logarithmic transformation was done to normalize the distribution of costs. Then, the geometric means of the surgery and no surgery samples for each procedure were compared using a t test (p value for 1-tail test). There were no significant differences found between the mean costs of the surgery and no surgery group for any CPES procedure. In fact, for only three procedures (hysterectomy, cholecystectomy, and varicose vein excisions) were the mean costs at all higher for the no surgery group. (Appendix 11 presents the mean expenditures for the surgery and no surgery groups for each procedure.)

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* As previously described, a direct adjustment was made for expenditures on related surgeries.

It is recognized that this approach to the measurement of substitute medical care costs is somewhat rough. There was a great deal of variability in the per case costs in both the surgery and no surgery groups. However, most of the procedures covered by CPES are ones where minimal alternative medical treatment costs are expected (e.g., elastic stockings for varicose veins), and, in the absence of specific procedure codes, a comparison of mean costs would not be able to detect small differences. Furthermore, the results are in accord with McCarthy's studies (1978) which also report minimal costs for alternative treatment in the no surgery group (there is no breakdown of related surgery and medical costs in McCarthy's published figures).

D. Summary

The savings figures reported for the Bay State and Central Mass. regions that are based on the review of program participants have been adjusted to reflect actual Medicaid payments for related surgeries. The gross savings per procedure were calculated as follows:

savings per procedure = (number of forgone surgeries times the average expected payment for each) minus (Medicaid payments for related surgery).

Program costs were allocated to procedures based on payments for consultations plus an allocation of HCF and DPW administrative costs based on the proportion of consultations and special considerations granted the procedure. Net savings for each procedure were calculated by reducing gross savings by the procedure's share of program costs.

Gross savings based on the number of forgone surgeries from the surgery rate analysis were adjusted to reflect related surgery costs. This was done by multiplying gross savings for each procedure based on the surgery rate analysis by the ratio of savings adjusted for related surgery to gross savings for each procedure based on review of program referrals. For example, if the gross savings figure for hysterectomy cases, based on the analysis of program referrals to Bay State and Central Mass., was reduced by 10 percent to account for expenditures for related surgery, the savings for hysterectomy cases from the surgery rate analysis for each HCF region were reduced by this same percentage. Thus:

savings per procedure = (number of forgone surgeries times average costs) minus (percentage reduction to account for costs of related surgery times gross savings).

This assumes a similar pattern of related surgery for the Charles River, Western and Southeastern Mass. regions (no data on related surgery for program referrals were available from these HCFs). It also assumes no substitute medical care costs for these areas, also based on the findings in Bay State and Central Mass. Per procedure costs for Western, Southeastern Mass., and Charles River were not available so only total savings are reported. Net savings figures exclude program costs for each HCF, including allocation of DPW's administration costs.

A more direct estimate of substitution costs based on the surgery rate analysis is difficult because of the inability to identify specific individuals for whom surgery was not proposed as a result of the CPES (the sentinel effect). The approach used (reducing gross savings based on the percentage reduction in gross savings from program referrals having related surgery) may underestimate savings because those not proposed may be less in need of surgery than those referred and may consequently be less likely to have a related surgery.

CHAPTER IV. ANALYSIS OF PERSONS REFERRED TO THE BAY STATE AND CENTRAL MASS. HCFS FOR SECOND OPINIONS

This chapter presents information on the program disposition and surgery decisions of 2501 persons* referred to the Bay State and Central Mass. HCFs for second opinion consultations by surgeons proposing to perform a CPES procedure. These individuals represent all cases referred to these foundations for a one year period. (In Chapter III, Section B, the type of information collected on each case and data sources used were presented.)

Section A outlines the number of proposing surgeons and several basic characteristics of the patients referred to these foundations: the proposed surgery, age, sex, and Medicaid category of assistance. Section B describes the program disposition of all patients: whether they cancel, receive special consideration, or have a second opinion consultation. For those patients that have consultations, the confirmation rates are reported as well as the extent of diagnostic testing, costs of consultation and the frequency with which proposing surgeons forward documentation to the foundations substantiating the recommendations for the CPES procedure.

In Section C, the direct program impact of the CPES is examined through an analysis of which patients referred to the CPES have the originally proposed surgery. Section D integrates various findings presented in the proceeding sections to address issues of interest to other areas considering the establishment of second opinion programs.

Most of the findings are presented by procedure and foundation as well as for the entire population of 2501 cases. The analysis focuses on these differences, which indicate that an SOP geared to a similar population, using a standard "hands-on" model, can have a varying impact on patients. Estimates of savings associated with patients referred to the CPES that do not have the originally proposed surgery are presented in Chapter VII.

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* Twenty-six individuals were referred for consultations for different CPES procedures at different times and therefore appear twice in the sample. To clarify presentation of the findings, however, "cases" will be referred to as patients.

A. Characteristics of Patients Referred to the CPES

1. Proposed Surgical Procedure. Individuals proposed for T&As and hysterectomies accounted for 64 percent of total referrals. Cholecystectomy and submucous resection (SMR) cases accounted for 10 and 8 percent of the referrals respectively and the remaining four procedures accounted for five percent or less of the cases.

There were significant variations in the case mix of referrals to the Bay State and Central Mass. HCFs, as illustrated in Exhibit X. In Bay State, 37 percent of the cases were proposed for T&As, 28 percent for hysterectomies and 7 percent for SMRs. In Central Mass., more than half of the cases (52 percent) were proposed for T&As, 12 percent for hysterectomies, and 12 percent for SMRs. Ten percent of the cases were proposed for cholecystectomies in both HCFs.

The number of surgeons referring patients and the range in the number of referrals per surgeon for each procedure are presented in Table 7. The total number of proposing surgeons is not provided because some surgeons proposed more than one type of CPES procedure and are therefore counted as proposing surgeons under more than 1 procedure. (General surgeons, for example, may be counted as proposing surgeons under hemorrhoidectomy, cholecystectomy, and varicose vein excisions.)

The frequency with which certain individual surgeons propose the largest volume CPES procedure, T&As, was examined. In Bay State, 11 percent of the individual providers proposing T&As proposed 47 percent of all patients referred to the foundations for that procedure (which translates into 10 surgeons proposing more than 20 patients each for T&As over a 12-month period).*

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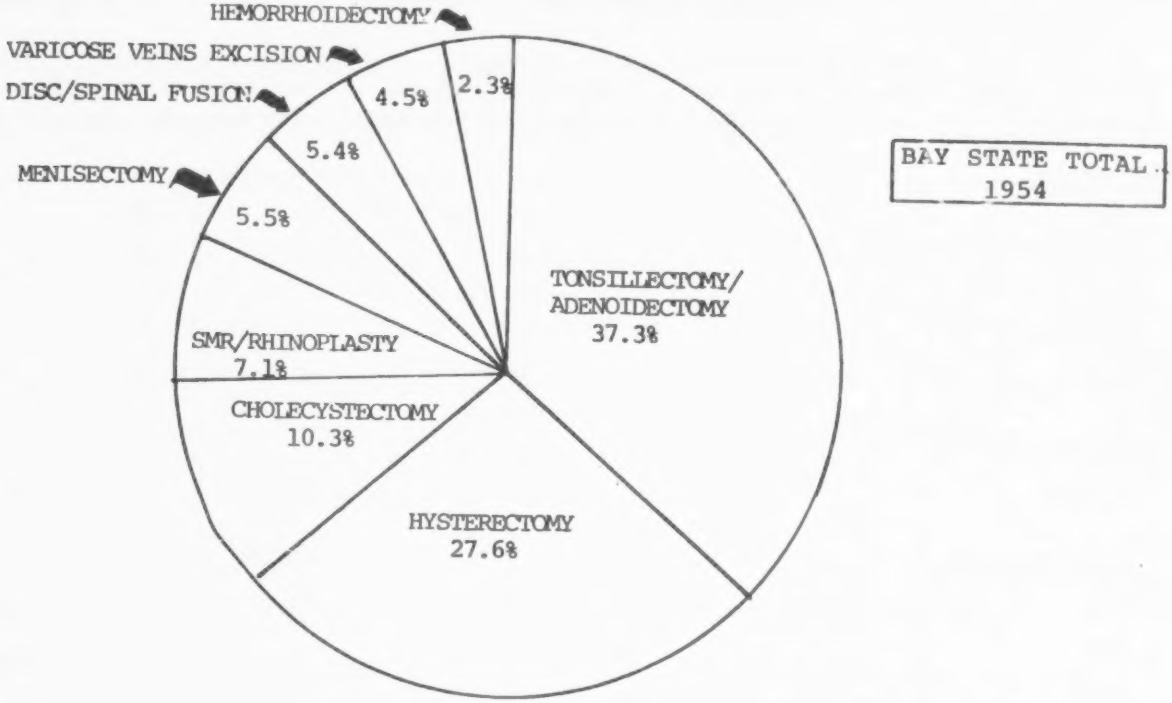
* These figures were calculated as follows: three provider numbers indicating group practices and the 100 patients proposed by these three groups were eliminated. Therefore, 10/87 equals 11 percent and 294/629 equals 47 percent.

Exhibit X

DISTRIBUTION OF REFERRALS BY PROPOSED PROCEDURE, BAY STATE AND CENTRAL MASS. HCFs

Bay State HCF



Central Mass. HCF

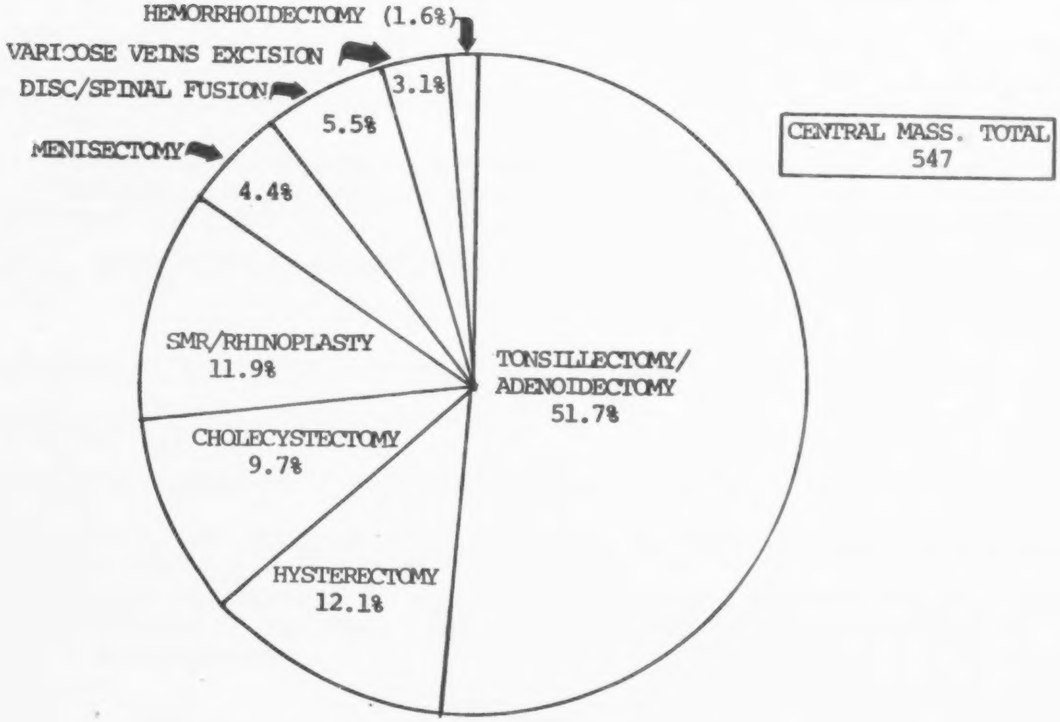


Table 7

NUMBER OF PROCEDURES AND NUMBER OF PROVIDERS PROPOSING SURGERY BY TYPE OF PROCEDURE AND FOUNDATION

Foundation and Procedure	Number of Procedures Proposed During One Year Study Period	Number of Surgeons Proposing Procedures*	Range in Number of Proposed Procedures Per Surgeon
Bay State			
T&A	729	90 (3)**	1 - 68
Hem	45	39	1 - 4
Chol	202	124 (2)	1 - 10
Meni	108	67	1 - 6
SMR	139	50 (1)	1 - 39
VV	87	59 (1)	1 - 8
Hyst	539	58 (1)	1 - 10
Disc/SF	30	14	1 - 5
Central Mass.			
T&A	283	28	1 - 45
Hem	9	9	1 - 1
Chol	53	34	1 - 5
Meni	24	14	1 - 4
SMR	65	14	1 - 17
VV	17	11	1 - 3
Hyst	66	42	1 - 5
Disc/SF	30	14	1 - 5

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* This number of proposing surgeons is based on the number of unique Medicaid Provider numbers reported on HCF intake forms to identify proposing surgeons over the study period.

** The number of provider group practices included appears in parentheses.

In Central Mass., 18 percent (5 individuals) of the surgeons referring patients for T&As proposed 52 percent of all patients (148) proposed for T&As that were referred for second opinions. It is unknown whether the relatively small number of surgeons proposing a relatively large proportion of total T&As are doing so because they are more likely to recommend T&As than other surgeons or because their patient caseload includes more Medicaid recipients than other surgeons.

2. Age and Sex Characteristics. Three-quarters of the 2501 referrals were females (excluding hysterectomy cases, two-thirds of the patients referred were female). Females accounted for 85 percent of the referrals over the age of 15; 63 percent of the males referred were under 15. The sex distribution of patients by proposed procedure and foundation appears in Appendix 12.

More than half of the referrals were between the age of 15 and 44. Less than 1 percent were over age 64, reflecting both the fact that the elderly generally have dual coverage and are not required to participate and that most of the CPES procedures are infrequently proposed on patients over 65.

Central Mass. had a statistically significant higher percentage of referrals under age 15 than Bay State (43 percent versus 31 percent), which is attributable to the higher percentage of patients referred for T&As (80 percent of such referrals are under the age of 15). The mean age of patients referred for each procedure by foundation is included in Appendix 13. Exhibit XI presents a comparison of age and sex distribution of referrals in Bay State and Central Mass.

3. Categories of Assistance. Seventy-eight percent of the persons referred to the foundations were covered under Aid to Families with Dependent Children (AFDC).* Individuals in categories of assistance excluded from the calculations of surgery rates because of dual coverage or ineligibility for inpatient benefits accounted for

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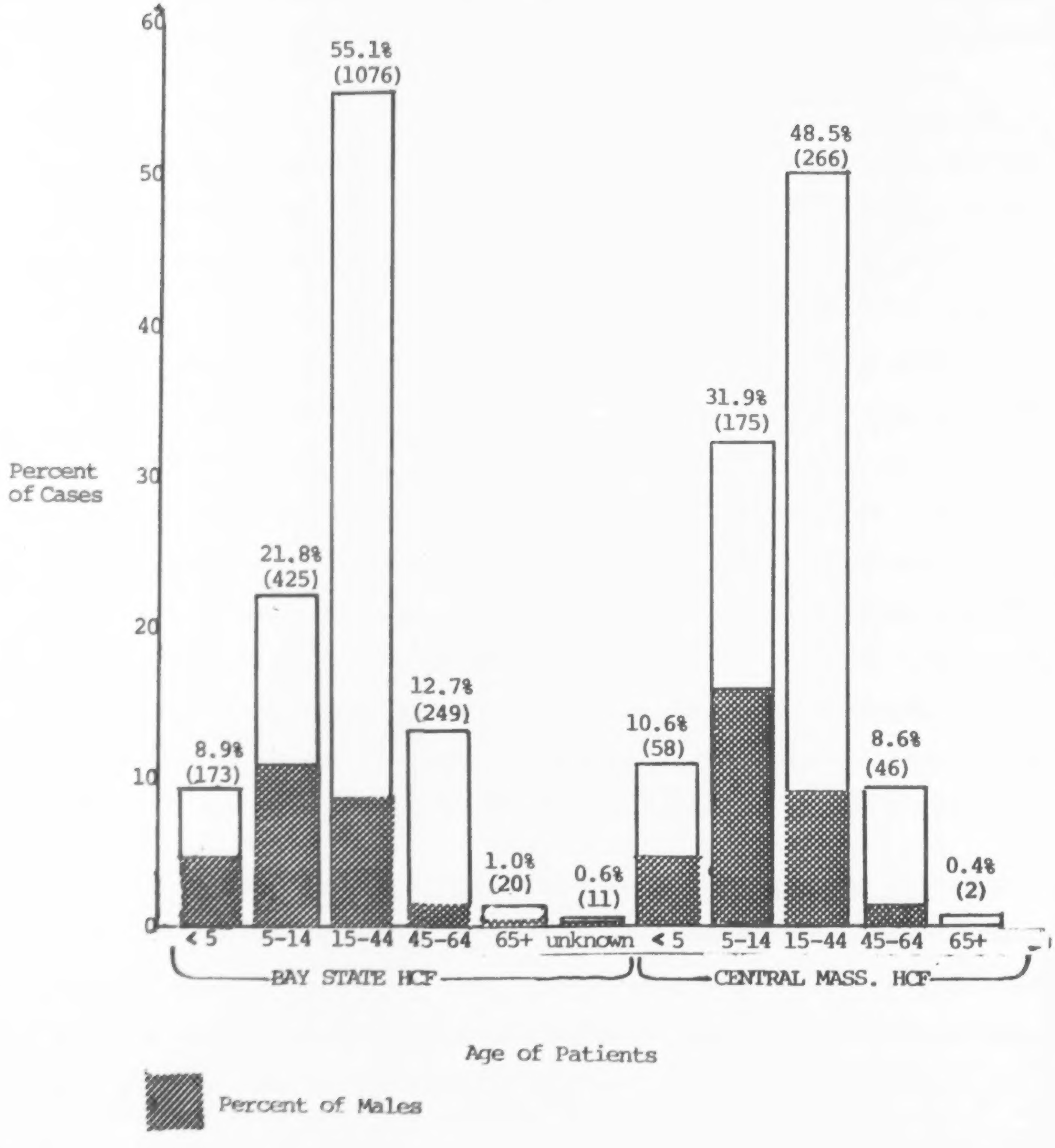
* The population figures used to calculate the surgery rates excluded categories 01, 03, 04, and 05; of the remaining categories, AFDC cases accounted for 86 percent of the population.

Exhibit XI

AGE AND SEX DISTRIBUTION OF REFERRALS BY FOUNDATION



10 percent of the referrals overall: 7 percent of Central Mass. referrals and 10 percent of Bay State's referrals. Appendix 14 presents the breakdown of referrals by category of assistance.

B. Program Dispositions

Patients referred to the Bay State and Central Mass. HCFs complete the CPES through one of the following six program dispositions:

- cancellation;
- special consideration;
- confirmed for CPES surgery by the first consultant;
- not confirmed for CPES surgery by the first consultant with no second consultation;
- not confirmed for CPES surgery by the first consultant, confirmed for the CPES surgery by the second consultant;
- not confirmed for CPES surgery by either the first or second consultant.

The surgeon of record and the hospital are eligible for reimbursement on all patients referred to the HCF, except those who cancel and those who receive a nonconfirmation and do not obtain a second consultation.

Exhibit XII highlights the program outcomes of the 2501 patients referred: 81 percent (2034) had a consultation; 10 percent cancelled (250), and 9 percent were granted special consideration (217). The following section provides more information on patients with each program disposition.

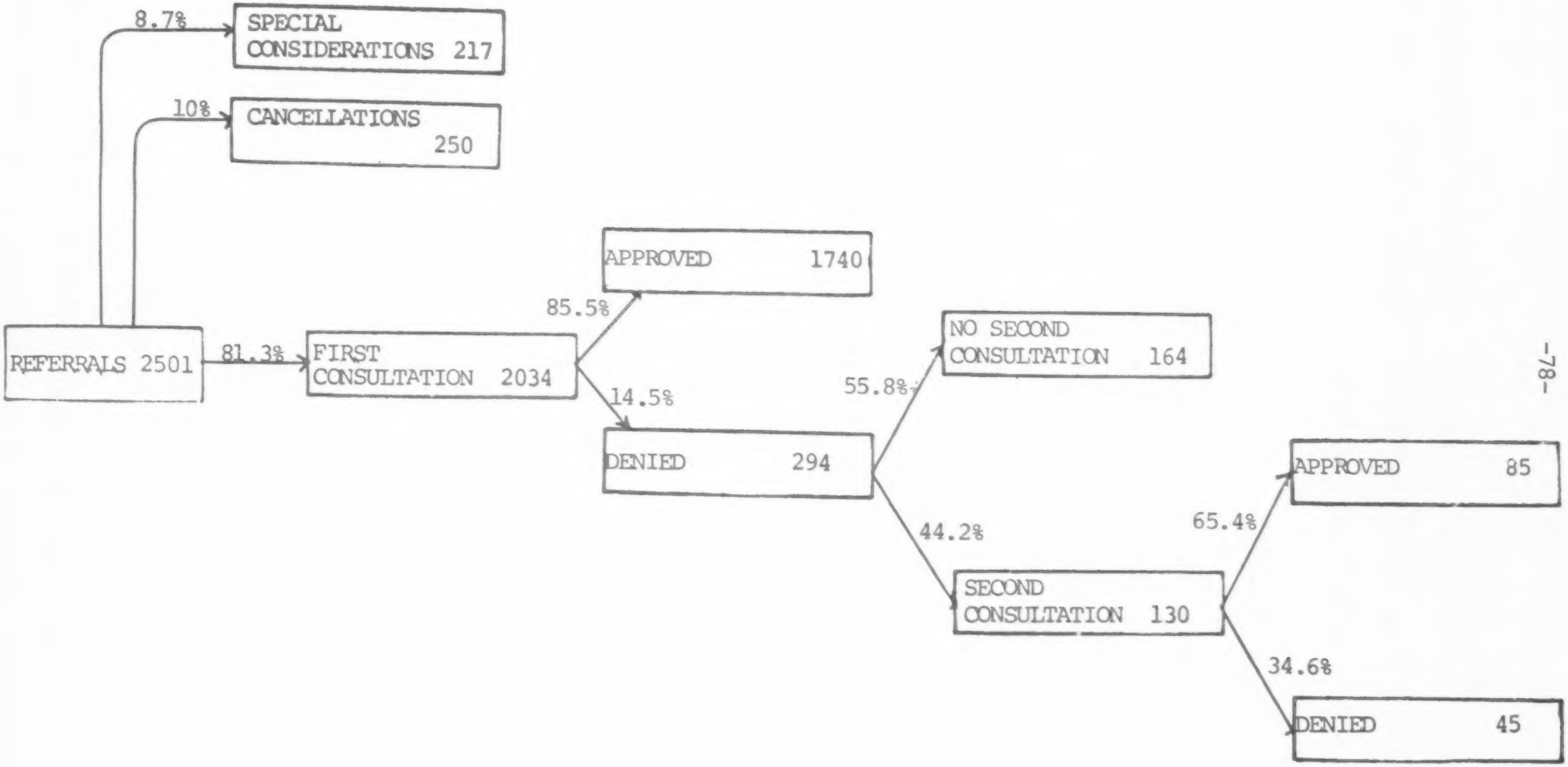
1. Consultation Cases. There were a total of 2164 consultations provided over 12 months in Bay State and Central Mass.: 2034 patients had first consultations; 130 of these had a second consultation after being nonconfirmed on the first consultation.

a) Number of Consultants. A total of 270 Bay State consultants provided 1649 consultations. Forty-six of the consultants (17 percent) rendered 60 percent

Exhibit XII

PROGRAM PARTICIPANT OUTCOMES

COMBINED BAY STATE AND CENTRAL MA. HCFs


REFERRALS 2501
8.7%
SPECIAL CONSIDERATIONS 217
10%
CANCELLATIONS 250
81.3%
FIRST CONSULTATION 2034
85.5%
APPROVED 1740
14.5%
DENIED 294
55.8%
NO SECOND CONSULTATION 164
44.2%
SECOND CONSULTATION 130
65.4%
APPROVED 85
34.6%
DENIED 45

of the consultations, as illustrated below:

> 36% of the consultants (97) provided 6% of the consultations;
>
> 47% of the consultants (127) provided 35% of the consultations;
>
> 11% of the consultants (29) provided 25% of the consultations;
>
> 6% of the consultants (17) provided 34% of the consultations.

(Characteristics of these consultants are described in Chapter II, pages 28-29.) In Central Massachusetts, 81 physicians participated as CPES consultants, providing a total of 515 second opinion consultations. Ten percent of Central Mass.'s consultants did 51 percent of the consultations:

- 1 each: 39% of the consultants provided 6% of the consultations;
- 2 to 20: 51% of the consultants provided 43% of the consultations;
- 21 or more: 10% of the consultants did 51% of the consultations.

b. Opinions Rendered by Consultants. Patients having a second opinion consultation have four possible program dispositions: 1) confirmation for surgery from the first consultant; 2) nonconfirmation of surgery from the first consultant, with no second consultation; 3) nonconfirmation, followed by a second consultation confirmation; or 4) nonconfirmation, followed by another nonconfirmation by the second consultant.

Table 8 presents the distribution of the 2034 patients that had a second opinion consultation by procedure, foundation, and the above four program dispositions. The overall confirmation rate was 85.5 percent on the first consultation, and the confirmation rate exceeded 90 percent in both foundations for hemorroidectomies, cholecystectomies, and varicose vein excisions, along with two other procedures exceeding 90 percent in only one of the foundations: T&As in Bay State and menisectomies in Central Mass. The lowest confirmation rates were for disc/spinal fusions (76 percent in Bay State, 68 percent in

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Table 8

PROGRAM DISPOSITIONS BY PROCEDURE AND FOUNDATION

Bay State HCF

Procedure	Confirmed First Consultation	Not Confirmed First Consult, No Second Consultation	Not Confirmed First Consult, Confirmed Second Consult	Not Confirmed First Consult, Not Confirmed Second Consult	Total Having Consultations
T&A	91.4% (586)	7.2% (46)	1.3% (8)	0.2% (1)	100.0% (641)
Hem	91.4% (32)	5.7% (2)	0.0% (0)	2.9% (1)	100.0% (35)
Chol	94.6% (155)	2.4% (4)	2.4% (4)	0.6% (1)	100.0% (164)
Meni	71.3% (62)	20.7% (18)	3.4% (3)	4.6% (4)	100.0% (87)
SMR	84.6% (99)	6.8% (8)	4.3% (5)	4.3% (5)	100.0% (117)
VV	90.7% (68)	5.3% (4)	2.7% (2)	1.3% (1)	100.0% (75)
Hyst	77.6% (295)	10.8% (41)	8.2% (31)	3.4% (13)	100.0% (380)
Disc/SF	75.8% (47)	9.7% (6)	6.4% (4)	8.1% (5)	100.0% (62)
TOTAL	86.1% (1344)	8.3% (129)	3.6% (57)	2.0% (31)	100.0% (1561)

Central Mass. HCF

Procedure	Confirmed First Consultation	Not Confirmed First Consult, No Second Consultation	Not Confirmed First Consult, Confirmed Second Consult	Not Confirmed First Consult, Not Confirmed Second Consult	Total Having Consultations
T&A	84.8% (228)	8.2% (22)	4.8% (13)	2.2% (6)	100.0% (269)
Hem	87.5% (7)	0.0% (0)	12.5% (1)	0.0% (0)	100.0% (8)
Chol	100.0% (38)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (38)
Meni	95.5% (21)	0.0% (0)	0.0% (0)	4.5% (1)	100.0% (22)
SMR	78.2% (43)	9.1% (5)	7.3% (4)	5.4% (3)	100.0% (55)
VV	92.9% (13)	7.1% (1)	0.0% (0)	0.0% (0)	100.0% (14)
Hyst	68.9% (31)	13.3% (6)	8.9% (4)	8.9% (4)	100.0% (45)
Disc/SF	68.2% (15)	4.5% (1)	27.3% (6)	0.0% (0)	100.0% (22)
TOTAL	83.7% (396)	7.4% (35)	5.9% (28)	3.0% (14)	100.0% (473)

Central Mass.), hysterectomies (78 versus 69 percent respectively), and submucous resections/rhinoplasties (85 and 78 percent respectively). When the first consultant does not confirm the need for surgery, the patient must have another consultation before the CPES surgery will be reimbursed by Medicaid. Of those patients not confirmed on the first consultation 164 (56 percent) did not have a second consultation. The percentage of cases not confirmed and not having a second consultation by procedure ranged from zero (for hemorrhoidectomies, cholecystectomies and menisectomies in Central Mass.) to 21 percent (for menisectomies in Bay State). Overall, 65 percent of the 130 patients having a second consultation were confirmed.

A more detailed discussion of confirmed and not confirmed cases is provided below.

c. Confirmations. The reasons given for confirmation on the first consultation are displayed in Table 9. (As there were no significant differences between the foundations, only the combined figures from both Bay State and Central Mass. are presented.)

Table 9

REASONS GIVEN FOR CONFIRMATION ON THE FIRST CONSULTATION BY PROCEDURE FOR BAY STATE AND CENTRAL MASS HCFs*

Reason	T&A (814)	Hem (39)	Chol (193)	Meni (83)	SMR (142)	VV (81)	Hys (326)	SF/D (62)	Total (1740)
Approval Without Comment	94.3%	100.0%	96.9%	84.3%	92.0%	97.5%	93.6%	69.8%	92.2%
Conditional Approval	0.4%	0.0%	2.1%	13.3%	2.2%	1.3%	4.0%	25.4%	2.9%
Other Approvals**	5.3%	0.0%	1.0%	2.1%	5.8%	1.2%	2.4%	4.8%	3.9%

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* Reasons extrapolated from consultant's comments by project staff.

** Includes approving the CPES procedure and 1) approving an additional procedure, 2) recommending medical treatment, or 3) approving only part of the proposed CPES procedure, e.g., the septoplasty but not the rhinoplasty, the adenoidectomy but not the tonsillectomy.

Of the confirmations, 93.2 percent were made without additional comment ("straight confirmation"). In some cases, the consultant made his approval conditional, making a comment such as "approved for surgery if patient loses weight," or "if results of laparoscopy/arthroscopy/etc. indicate need for surgery." Conditional confirmations were made on 25 percent of the disc/spinal fusion cases, 13 percent of the menisectomy cases, and 4 percent of the hysterectomy cases. At Bay State, the form letter to the surgeon generally only states whether the consultant confirms the need for surgery, and does not refer to any condtions placed on the confirmation. At Central Mass., special letters are sent outlining the consultant's concerns and recommendations. There is no CPES policy regarding conditional approvals. Therefore, the proposing surgeon may take the consultant's conditional confirmation as a recommendation, but is in no way restricted by it.

d. Nonconfirmations. The first consultant disputed the need for surgery in 14.5 percent of the cases, with the nonconfirmation rate slightly higher in Central Mass. at 16.3 percent, versus 13.9 percent at Bay State. Cases proposed for spinal fusion/disc surgery, menisectomy, and hysterectomy were not confirmed 23 percent (or more) of the time for both foundations combined.

There were many differences in the nonconfirmation rate by procedure and foundation, as illustrated in Table 10. Central Mass. had a statistically significant higher nonconfirmation rate for T&As (15.2 percent) than Bay State (8.6 percent). This higher rate may be related to the fact that in Central Mass., the rate of T&As is twice as high as in Bay State.

In general, there was no significant association between patient age and confirmation/nonconfirmation. The only procedure where there was a significant relationship was in T&A cases at Bay State, where patients over 10 years of age were twice as likely to not be confirmed as cases under 10 (12.7 against 6.8 percent). (No significant relationship existed between age and outcome for T&A cases in Central Mass.)

Table 10

PERCENTAGE AND NUMBER OF CASES NOT CONFIRMED ON FIRST CONSULTATION BY PROCEDURE AND FOUNDATION

Procedure	Bay State HCF Percent	No.	Central HCF Percent	No.	Combined HCFs Percent	No.
T&A	8.6%	55	15.2%	41	10.5%	96
Hem	8.6%	3	12.5%	1	9.3%	4
Chol	5.5%	9	0.0%	0	4.5%	9
Meni	28.7%	25	4.5%	1	23.9%	26
SMR	15.4%	18	21.8%	12	17.4%	30
VV	9.3%	7	7.1%	1	9.0%	8
Hyst	22.4%	85	31.1%	14	23.3%	99
Disc/SF	24.2%	15	31.8%	7	26.2%	22
TOTALS	13.9%	217	16.3%	77	14.5%	294

Nor was there any statistically significant relationship between patient sex and consultation outcome, except for T&A cases in Bay State, where females were more likely to not be confirmed than males. Females were also overrepresented in the over-10 age group, but because of the small numbers, it was difficult to determine whether age or sex was related to this higher nonconfirmation rate.

The most common reason stated by consultants for nonconfirmation was that surgery was medically unnecessary (40 percent of all nonconfirmations). Other reasons included "insufficient evidence to make a decision," and "recommend other treatment." Consultants in Bay State were more likely to identify the proposed surgery as "not medically necessary" (45 percent of the reasons for nonconfirmation) than consultants at Central Mass. (25 percent). The percentage of nonconfirmations specifically identified as medically unnecessary, by procedure, is presented in Appendix 15.

Of the 294 patients not confirmed on the first consultation, 130 (44 percent) had a second consultation. As depicted in Table 11, this occurred more frequently in Central Mass. (55 percent of the patients) than in Bay State

(41 percent), a significant difference (p = .03). More than half of patients not confirmed for the disc/spinal fusion, submucous resection/rhinoplasty, cholecystectomy and hysterectomy cases opted to have a second consultation. Patients not confirmed for T&As were least likely to have a second consultation (29 percent).

Table 11

PERCENTAGE NONCONFIRMED ON FIRST CONSULTATION, HAVING SECOND CONSULTATION

Procedure	Bay State HCF	Central Mass. HCF	Combined Foundations
T&A	16.4% (9)	46.3% (19)	29.2% (28)
Hem	33.3% (1)	100.0% (1)	50.0% (2)
Chol	55.6% (5)	0.0% (0)	55.6% (5)
Meni	28.0% (7)	100.0% (1)	30.8% (8)
SMR	55.6% (10)	58.3% (7)	56.7% (17)
VV	42.9% (3)	0.0% (0)	37.5% (3)
Hyst	51.8% (44)	57.1% (8)	52.5% (52)
Disc/SF	60.0% (9)	85.7% (6)	68.2% (15)
TOTAL	40.6% (88)	54.5% (42)	44.2% (130)

One third of the patients having second consultations were not confirmed, a nonconfirmation rate more than twice as high as that of the first consultations (34.6 versus 14.5 percent). This was expected, as patients having a second consultation have already been nonconfirmed by one consultant, and therefore represent a different case mix from those having a first consultation. Although the per procedure nonconfirmation rates appear in Table 12, the small number of nonconfirmations in the second consultations (45) make it difficult to compare across procedures. The single reason most frequently given for the denial was "not medically necessary" (36 percent), although a recommendation for some other medical or surgical treatment accompanied 45 percent of the denials.

e. Time Required for Program Completion. The program completion date for patients having a consultation is the date when letters are sent to the patient and proposing surgeon notifying them of the outcome of the last consultation.

Table 12

NONCONFIRMATION RATE ON SECOND CONSULTATION BY PROCEDURE AND FOUNDATION

Procedure	Bay State HCF	Central Mass HCF
Tonsillectomy/ Adenoidectomy	11.1% (1)*	31.6% (6)
Hemorrhoidectomy	100.0% (1)	0.0% (0)
Cholecystectomy	20.0% (1)	0.0% (0)
Menisectomy	57.1% (4)	100.0% (1)
Submucous Resection	50.0% (5)	42.9% (3)
Varicose Vein Excision	33.3% (1)	0.0% (0)
Hysterectomy	29.5% (13)	50.0% (4)
Disc/Spinal Fusion	55.6% (5)	0.0% (0)
TOTAL	35.2% (31)	33.3% (14)

---

* Numbers in parentheses indicate number of patients not confirmed on second consultation.

For patients having only one consultation, the mean length of time from the referral date to the completion date was 28 days in Bay State, 18 days in Central Mass., and 25 days for the combined foundations. Most of this time transpired between the referral and the date of consultation (19 days in Bay State and 12 days in Central Mass.). Patients having two consultations took an average of 64 days to complete the program (68 days in Bay State and 56 days in Central Mass.). The time delay here occurred between the first and second consultations, 43 days in Bay State and 36 days in Central Mass.

One factor that contributes to the average time required to complete the program is a missed appointment, which requires rescheduling. Of the 1904 cases with only one consultation, 207 (11 percent) missed at least one appointment. Of these, patients with one missed appointment (180) doubled the time from referral to program completion (25 to 45 days) and patients with more than one missed appointment (127) tripled the time to program completion (25 to 82 days). Thirty-two of the 130 patients (25 percent) that had two consultations missed at least one appointment and 21 percent of those missed more than one appointment.

f. Documentation. As described in Chapter II, the proposing surgeon is asked to forward documentation on the need for surgery to the foundation, which then forwards it to the consultant, after blocking out any material that would identify the proposing surgeon. Documentation may be simply a diagnosis with a statement of need, but can include a complete medical history with test results.

Documentation was forwarded to the foundations for 62 percent of the first consultations (65.3 percent in Central Mass. and 60.6 percent in Bay State). The percentage of cases with documentation available in the first consultation by procedure and foundation is presented in Appendix 16. Sixty-nine percent of the cases having second consultations had documentation.

There was no statistically significant relationship between whether documentation was sent and whether the consultant confirmed or did not confirm the proposed procedure.

g. Diagnostic Testing. Eight percent of the patients having second opinion consultations in Bay State had diagnostic tests ordered by the consultants compared to 16 percent of the patients in Central Mass. The extent of testing ordered by consultants, by procedure and foundation, is shown in Table 13.

Table 13

PERCENT OF FIRST CONSULTATION CASES WITH DIAGNOSTIC TESTING
BY PROCEDURE AND FOUNDATION

Procedure	Bay State HCF	Central Mass HCF	Combined HCFs
T&A	4.5% (29)	19.0% (51)	8.8% (80)
Hem	22.9% (8)	25.0% (2)	23.3% (10)
Chol	4.3% (7)	7.9% (3)	5.0% (10)
Meni	3.4% (3)	9.1% (2)	4.6% (5)
SMR	1.0% (1)	14.5% (8)	5.2% (9)
VV	1.3% (1)	0.0% (0)	1.1% (1)
Hyst	20.0% (76)	15.6% (7)	19.5% (83)
Disc/SF	1.6% (1)	9.1% (2)	3.6% (3)
TOTAL	8.1% (126)	15.9% (75)	9.9% (201)

Diagnostic tests on the first consultation were most frequently done on patients proposed for hemorrhoidectomies (23.3 percent) and hysterectomies (19.5 percent). Anoscopies were the test most often done on hemorrhoid cases. Tests done on hysterectomy cases included Pap smears, blood tests, urinalysis and cultures.

In Central Mass., 19 percent of the T&A cases had diagnostic tests, compared to 4.5 percent in Bay State. The tests done on T&A cases in Central Mass. were various types of hearing tests.

In both foundations, 63.7 percent (128) of the first consultation cases having diagnostic tests involved only one test. However, 28.9 percent (59) of the consultations required two tests, 6 percent (12) required three, and 1.5 percent (3) required four tests.

Of all the 189 tests (for 126 patients) ordered for the first consultations in Bay State, 62 percent involved hysterectomies. Of the 103 total tests (for 75 patients) at Central Mass., 65 percent were for T&A consultations.

Fourteen percent of the patients having second consultations had diagnostic testing: in Bay State, most of these tests were done on hysterectomy cases; in Central Mass., most were done on T&A cases.

Overall, in Bay State, patients having diagnostic tests were more often not confirmed (29 percent) than patients having no testing (13 percent) on the first consultation. In Central Mass., this relationship was statistically significant only for hysterectomy cases, with 71 percent of the patients with diagnostic tests not being confirmed compared to 23 percent of the patients not having tests. While this finding is hard to interpret without additional information on specific cases, it may be that Bay State consultants (and Central Mass. consultants reviewing hysterectomy cases) were more likely to order tests for patients where there was some doubt about the need for surgery, than on patients where the need for surgery could be determined without additional tests.

h. Amount Billed by Consultants. Consultants are permitted to bill the foundations $12, $20, or $30 per consultation, depending on their own evaluation of the complexity and extensiveness of the examination, using Medicaid fee schedule guidelines.

Table 14 presents the number and percentage of consultations billed at the different fee rates by foundation. The majority of consultations (63 percent) were billed at $30. Central Mass. had a statistically significant (p= .00) higher percentage of cases billed at $12 (11 percent) against Bay State (4 percent).

Table 14

AMOUNT AND PERCENTAGE OF CONSULTATIONS BILLED BY CONSULTATION FEE RATE BY FOUNDATION AND COMBINED FOUNDATIONS

	-----Bay State HCF----		---Central Mass. HCF--		--Combined HCFs-----	
Fee	number of consults	percent of consults	number of consults	percent of consults	number of consults	percent of consults
$12	65	3.9%	57	11.1%	122	5.6%
$20	524	31.7%	148	28.7%	672	31.0%
$30	1060	64.3%	310	60.2%	1370	63.3%
Totals	1649	100.0%	515	100.0%	2164	100.0%

To examine the mean rates billed by type of surgical specialist, consultations related to each CPES procedure group were regrouped according to the surgical specialty of the consultants assigned the cases, as follows:

- all consultations for T&As and submucous resections/rhinoplasties were assigned to otolaryngologists;
- all consultations for hemorrhoidectomies, cholecystectomies, and varicose vein excisions were assigned to general surgeons;
- all consultations for hysterectomies to gynecologists;
- all consultations for menisectomies, disc/spinal fusions to orthopedic surgeons (although some neurosurgeons were used on spinal fusion cases).

Table 15 presents the number and percentage of consultations and the mean rate billed by each specialty, by each foundation and the combined foundations.

Table 15

NUMBER OF CONSULTATIONS AND MEAN AMOUNT BILLED, BY CONSULTANT SPECIALTY AND FOUNDATION

Specialty	Bay State HCF Consultations/Mean Rate			Central Mass. HCF Consultations/Mean Rate			Combined HCFs Consultations/Mean Rate		
	No.	%	$	No.	%	$	No.	%	$
Orthopedists	167	10.1%	28.52	51	9.9%	24.31	218	10.1%	27.54
Otolarygnolog.	776	47.1%	27.11	350	68.0%	26.91	1126	52.0%	27.04
Gynecologists	423	25.7%	26.36	53	10.3%	21.89	476	22.0%	25.87
General Surg.	283	17.1%	21.65	61	11.8%	18.46	344	15.9%	21.08
TOTAL	1649	100.0%	26.12	515	100.0%	25.13	2164	100.0%	25.88

Otolaryngologists at Central Mass. had the highest mean rate billed by consultants ($26.91), while at Bay State, orthopedists ranked highest in mean rates ($28.52 per consult). General surgeons on average bill the least amount for their consultations, about $22 at Bay State and $18 at Central Mass.

2. Special Consideration Cases. The hands-on consultation model of the CPES has a provision for cases to be granted special consideration, which waives the necessity for a consultation. Special considerations are granted for medical reasons (seriousness of condition, patient in acute pain, the patient is already in the hospital) and for travel hardship (the nearest consultant's office is 15-20 miles away). (See Chapter II for a complete review for the process of granting special considerations.)

Nine percent of the total referrals (217 cases) were granted special considerations. At Bay State, 9.1 percent of the patients referred (178 cases) were granted special considerations compared to 7.1 percent (39 cases) at Central Mass.

The overwhelming majority of special considerations were granted for medical necessity: 81 percent (144 cases) at Bay State and 72 percent (28 cases) at Central Mass. Travel hardship was the reason given for 4% of Bay State's special consideration cases and 26% of the special consideration cases in Central Mass. There was no reason for granting the special consideration documented on the foundation intake form for 15% of Bay State's cases and 2% of Central Mass.

The breakdown of the number and percent of referrals receiving special considerations by procedure group is presented in Table 16.

Table 16

PATIENTS RECEIVING SPECIAL CONSIDERATION AS A PERCENT OF REFERRALS BY PROCEDURE AND FOUNDATION

Procedure	Bay State	Central Mass.	Combined Foundations
Tonsillectomy/ Adenoidectomy	1.0% (7)	1.1% (3)	1.1% (10)
Hemorrhoidectomy	4.4% (2)	11.1% (1)	5.5% (3)
Cholecystectomy	10.4% (21)	17.0% (9)	11.8% (30)
Menisectomy	8.3% (9)	8.3% (2)	8.3% (11)
Submucous Resect.	0.7% (1)	1.5% (1)	0.9% (2)
Varicose Vein	6.9% (6)	0.0% (0)	5.8% (6)
Hysterectomy	18.9% (102)	24.2% (16)	19.5% (118)
Disc/Spinal Fusion	28.6% (30)	23.3% (7)	27.4% (37)

Patients proposed for disc/SF surgery were most likely to receive a special consideration in Bay State (29 percent); 78 percent of these were granted the special consideration because of medical necessity, usually because the patient was already in the hospital. In Central Mass., hysterectomy had the highest percent of special consideration (24 percent), while at Bay State and overall, hysterectomies ranked second (19 and 20 percent respectively). Eighty-four percent of the special considerations for hysterectomies were granted because of medical necessity, mostly for cancer in situ. Special considerations were rarely granted for patients proposed for T&As (only 1 percent of referrals), or for submucous resection/rhinoplasty (1 percent).

3. Cancellations. Eleven percent (284) of the patients referred to the Bay State and Central Mass. HCFs cancelled out of the program.* The following discussion presents information on the timing and reasons given for patients cancelling. These findings permit identification of the number of inappropriate referrals made to the HCFs (e.g., if the patient was ineligible, or the proposed procedure did not require CPES review), along with identification of a residual group of patients who were eligible, and whose providers would therefore be subject to nonreimbursement of any claim for a CPES procedure. Such persons may be deterred from having surgery because of the delay and effort required to obtain a second opinion consultation, and the proposing surgeon may likewise be unwilling to perform a surgery for which reimbursement may not be made.

Of the patients cancelling, 88 percent do so before obtaining a CPES consultation (the remaining 12 percent cancel after the consultation or a special consideration). The percentage of patients who cancel prior to a consultation differs by procedure and foundation, as illustrated in Table 17.

Table 17

CANCELLATIONS* AS A PERCENTAGE OF REFERRALS BY PROCEDURE AND FOUNDATION

Procedure	Bay State HCF	Central Mass. HCF	Combined HCFs
T&A	11.1% (81)	3.9% (11)	9.1% (92)
Hem	17.8% (8)	0.0% (0)	14.8% (8)
Chol	8.4% (17)	11.3% (6)	9.1% (23)
Meni	11.1% (12)	0.0% (0)	9.1% (12)
SMR	15.1% (21)	13.8% (9)	14.7% (30)
VV	6.9% (6)	17.6% (3)	8.7% (9)
Hyst	10.6% (57)	7.6% (5)	10.2% (62)
SF/Disc	12.4% (13)	3.3% (1)	10.4% (14)
TOTALS	11.0% (215)	3.9% (35)	9.1% (250)

* Prior to any consultation or special consideration waiver

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* This differs from the 250 cancellations indicated on Exhibit VI, because 34 patients cancelled after receiving a special consideration or a consultation.

In Bay State, 11 percent of the patients cancel overall, with relatively more patients proposed for hemorrhoidectomy, submucous resection/rhinoplasty, and disc/spinal fusion procedures cancelling than patients proposed for other procedures. In Central Massachusetts, the overall percentage of referred patients who cancelled was 6 percent, with patients proposed for varicose vein excision, submucus resection/rhinoplasty and cholecystectomy most likely to cancel.

Most of the patients who cancelled prior to a consultation simply never showed for their scheduled appointment (62 percent in Bay State and 54 percent in Central Mass.), with no specific reason given. The distribution of never shows and the percentage of patients referred accounted for by never shows is presented in Table 18. Bay State had a higher percentage of never show cases than Central Mass. (6.8 percent versus 3.5 percent). By procedure, there were relatively more never shows for hemorrhoidectomies (15.6 percent in Bay State), submucous resections (5.8 percent for both foundations) and varicose vein excisions (5.8 percent for both foundations). These three procedures are considered relatively minor surgeries, and these percentages may indicate that some referrals in these procedure groups were not in distress and chose not to follow through in obtaining a second opinion.

Table 18

NUMBER OF NEVER SHOWS AS A PERCENTAGE OF CASES REFERRED, BY PROCEDURE AND FOUNDATION*

	T&As		Hem		Chol		Meni		SMR		VV		Hys		SF/D		Totals	
	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
B.S.	8.2	(60)	15.6	(7)	2.0	(4)	6.5	(7)	10.8	(15)	4.6	(4)	5.8	(31)	4.8	(5)	6.8	(133)
C.M.	2.1	(6)	-	(0)	7.5	(4)	-	(0)	10.8	(7)	11.8	(2)	-	(0)	-	(0)	3.5	(19)
BOTH	6.5	(66)	13.0	(7)	3.1	(8)	5.3	(7)	10.8	(21)	5.8	(6)	5.1	(31)	3.7	(5)	6.1	(152)

Note: 27 of the 133 never-show cases at Bay State missed more than 1 appointment, as did 3 of the 19 never show cases at Central Mass.

* The numerator in this chart represents the number of never show cases at each foundation (and combined foundations) by procedure; the denominator represents the total number proposed for surgery at each foundation (and combined foundations) by procedure.

Table 19 provides the frequency distribution of reason given for cancellation. Patients inappropriate referred to the HCF for a second opinion consultation include those with other insurance (18), patients proposed for procedures not covered by CPES (9), and patients ineligible for Medicaid (8). Patients who cancelled for these reasons account for 15 percent of Bay State cancellations and 29 percent of Central Mass. cancellations for all cancellations prior to a consultation. Medicaid is not at risk for CPES surgery claims for these individuals, and the CPES program would probably not affect in any way the surgery decisions of these patients. Nor would the CPES be expected to alter the surgery decisions of:

- the 17 patients who cancelled because of an emergency admission (emergency admissions are exempt from CPES requirement);
- the 9 patients who had surgery prior to their referral;
- the 1 person admitted as a private patient.

The remaining 188 patients who cancelled prior to a second opinion consultation comprise a group that may forgo CPES surgery because of a barrier effect of the program, i.e., the requirement of obtaining a second opinion acts as a barrier to having the surgery. CPES surgery performed on patients from this group may not be reimbursed under CPES regulations.

C. Surgery Dispositions of HCF Referrals

1. Follow-Up Period. All patients proposed for CPES surgery that were referred to the Bay State and Central Mass. HCFs during the respective study periods were tracked through 31 December 1978 to determine whether surgery took place and was billed to Medicaid. Given that patient referral dates ranged from 1 May 1977 to 30 September 1978, the length of time that patients were followed varied. In Bay State, all patients were followed for at least 8 months and 68 percent were followed for 12 or more months; in Central Mass., all patients were followed for at least 3 months and 78 percent were tracked for 6 months or

Table 19

NUMBER OF PATIENTS WHO CANCEL PRIOR TO THEIR FIRST CONSULTATION BY REASON, FOUNDATION, AND COMBINED FOUNDATIONS

Reason	Bay State HCF	Central Mass. HCF	Combined HCFs
a. Never Show	133	19	152
b. Other Insurance	14	4	18
c. Patient Proposed for Procedure Not Covered By CPES	6	3	9
d. Patient Ineligible for Medicaid	5	3	8
e. Patient Admitted as Emergency	17	0	17
f. Patient Admitted as Private Patient	1	0	1
g. Patient has CPES Surgery Prior to HCF Referral	4	5	9
h. Other*	35	1	36

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* Includes: surgeon decided against surgery (11); hospital out of HCF area (7), and patient moved (2).

more. For those patients that did have the surgery, 93 percent had the operation within three months of their referral date, and 98 percent had the operation within 6 months. As described in Chapter III, Section B-3, this length of follow-up is considered sufficient for making statements about the number of program referrals having surgery, at least in the short run.*

Of the 2501 patients referred to the two foundations, 72 percent had the orginally proposed surgery, 22 percent had no surgery, 4 percent had a related surgery, and 2 percent of the patients were placed in an "unknown" surgery category because project staff were unable to determine whether CPES surgery took place.** Slightly more patients referred to Central Mass. HCF have the proposed surgery (76 percent) than patients referred to Bay State (71 percent).

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* Patients who do not have the proposed surgery within six months of completing the program are required to repeat the process.

** Patients were placed in the unknown surgery status category if the Medicaid billing system indicated that Medicare was paying a portion of their medical bills and there was no surgery code, or if the surgery code was listed as 9299, an unlisted procedure on the fee schedule, or if project staff could not identify the patient's Medicaid cardholder number.

The following discussion examines the surgery disposition of referred patients by procedure (2), by patient characteristics (3), and by patient program disposition.

2. Surgery Dispositions by Procedure. Table 20 presents the surgery dispositions of referred patients by procedure and foundation. In Bay State, 71 percent of the referred patients had the originally proposed surgery, 5 percent had a related surgery, 23 percent had no surgery, and the surgery outcome was unknown for 2 percent of the patients. Fewer than 60 percent of the patients referred for menisectomy, hemorrhoidectomy, and disc/spinal fusion had the originally proposed CPES surgery, while over 80 percent of the patients proposed for cholecystectomy proceeded to have that operation.

In Central Mass., 76 percent of the patients had the originally proposed procedure, 3 percent had a related surgery, 20 percent had no surgery, and 1 percent of the patients had an unknown surgery outcome. Patients proposed for SMR/rhinoplasty (54 percent) and varicose vein excision (53 percent) were least likely to have the CPES surgery, while 80 percent or more of the patients proposed for hemorrhoidectomy, cholecystectomy, and T&A had the originally proposed procedure.

Patients forgoing CPES surgery but having a related surgery* were most frequently proposed for menisectomies (19 percent), followed by spinal fusion/ disc surgery (13 percent), hemorrhoidectomy (9 percent), and hysterectomy (9 percent). The most frequent type of related surgeries were (in order): arthroscopies, myleograms, anoscopies, and dilation and curettage (D&C).

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* See Chapter III, Section C, for a discussion of which types of surgical procedures were considered related to the originally proposed CPES operation.

Table 20

DISTRIBUTION OF HCF-REFERRED PATIENTS BY SURGERY DISPOSITION AND PROCEDURE

Procedure	CPES Surgery	Related Surgery	No Surgery	Outcome Unknown	Total
- - - Bay State HCF - - -					
T&A	553 (75.9%)	1 (0.1%)	173 (23.7%)	2 (0.3%)	729 (100.0%)
Hem	26 (57.8%)	5 (11.1%)	14 (31.1%)	0 (0.0%)	45 (100.0%)
Chol	166 (82.2%)	1 (0.5%)	32 (15.8%)	3 (1.5%)	202 (100.0%)
Meni	51 (47.2%)	21 (19.5%)	31 (28.7%)	5 (4.6%)	108 (100.0%)
SMR	93 (66.9%)	0 (0.0%)	38 (27.3%)	8 (5.8%)	139 (100.0%)
VV	58 (66.7%)	0 (0.0%)	28 (32.2%)	1 (1.1%)	87 (100.0%)
Hyst	376 (69.8%)	46 (8.5%)	107 (19.9%)	10 (1.8%)	539 (100.0%)
SF/Disc	61 (58.1%)	16 (15.2%)	25 (23.8%)	3 (2.9%)	105 (100.0%)
TOTAL	1384 (70.8%)	90 (4.6%)	448 (22.9%)	32 (1.6%)	1954 (99.9%)*
- - - Central Mass. HCF - - -					
T&A	233 (82.3%)	1 (0.4%)	48 (16.9%)	1 (0.4%)	283 (100.0%)
Hem	8 (88.9%)	0 (0.0%)	1 (11.1%)	0 (0.0%)	9 (100.0%)
Chol	45 (84.9%)	0 (0.0%)	4 (7.5%)	4 (7.5%)	53 (99.9%)*
Meni	16 (66.7%)	4 (16.7%)	3 (12.5%)	1 (4.1%)	24 (100.0%)
SMR	35 (53.8%)	1 (1.5%)	26 (40.0%)	3 (4.6%)	65 (99.9%)*
VV	9 (52.9%)	0 (0.0%)	8 (47.1%)	0 (0.0%)	17 (100.0%)
Hyst	47 (71.2%)	7 (10.6%)	11 (16.7%)	1 (1.5%)	66 (100.0%)
SF/Disc	23 (76.7%)	1 (3.3%)	6 (20.0%)	0 (0.0%)	30 (100.0%)
TOTAL	416 (76.1%)	14 (2.6%)	107 (19.5%)	10 (1.8%)	547 (100.0%)
- - - Combined Foundations - - -					
T&A	786 (77.7%)	2 (0.2%)	221 (21.8%)	3 (0.3%)	1012 (100.0%)
Hem	34 (63.0%)	5 (9.3%)	15 (27.7%)	0 (0.0%)	54 (100.0%)
Chol	211 (82.7%)	1 (0.4%)	36 (14.1%)	7 (2.7%)	255 (99.9%)*
Meni	67 (50.8%)	25 (18.9%)	34 (25.8%)	6 (4.5%)	132 (100.0%)
SMR	128 (62.7%)	1 (0.5%)	64 (31.4%)	11 (5.4%)	204 (100.0%)
VV	67 (64.4%)	0 (0.0%)	36 (34.6%)	1 (1.0%)	104 (100.0%)
Hyst	423 (69.9%)	53 (8.8%)	118 (19.5%)	11 (1.8%)	605 (100.0%)
SF/Disc	84 (62.2%)	17 (12.6%)	31 (23.0%)	3 (2.2%)	135 (100.0%)
TOTAL	1800 (71.9%)	104 (4.2%)	555 (22.2%)	42 (1.7%)	2501 (100.0%)

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*Discrepancies due to rounding.

3. Surgery Dispositions by Patient Characteristics. There was no significant relationship between sex of patient and disposition of surgery: males accounted for 34 percent of the referrals (minus hysterectomies) and 31 percent of the surgeries (minus hysterectomies). Nor was there any statistically significant relationship between patient age and surgery disposition, although T&A and cholecystectomy surgery cases were slightly younger than all referrals for these procedures and hemorrhoidectomy cases having surgery were slightly older than all hemorrhoidectomy referrals.

4. Surgery Dispositions by Program Disposition. The decision to have surgery is clearly related to program disposition. Table 21 presents the surgery dispositions of patients referred to the CPES by their program disposition. Patients confirmed for surgery by the first consultant are most likely to have the originally proposed CPES surgery (86 percent), and patients not confirmed and having no second consultation are least likely to have surgery (7 percent).

a) Patients Having Consultations. In Bay State, 85 percent of the patients confirmed for CPES surgery by the first consultant have the CPES surgery and an additional 3 percent have a related surgery. In Central Mass., 89 percent of the confirmed patients had CPES surgery and 1.5 had a related surgery. A total of 180 confirmed patients had no surgery and 52 confirmed patients had a related surgery in both foundations combined.

In both foundations combined, 3 percent of patients were given conditional confirmations by the first consultant, but conditional confirmation cases represented 7.5 percent of confirmations not having a CPES surgery.* In Bay State, for example, there was a statistically significant relationship between receiving a conditional confirmation and not having a proposed menisectomy, hysterectomy

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* Confirmations were considered "conditional" where consultants indicated their confirmation was conditional on certain conditions being met (see page 82). However, there are no special provisions for CPES staff to enforce such conditions, and proposing surgeons therefore may treat such cases as straight confirmations.

Table 21

DISTRIBUTION OF HCF-REFERRED PATIENTS BY SURGERY AND PROGRAM DISPOSITION

	- - - - - - Surgery Disposition - - - - -				
Program Disposition	CPES Surgery	Related Surgery	No Surgery	Unknown	Total
- - - BAY STATE HCF- - -					
Confirmed	1135 (84.5%)	46 (3.4%)	147(10.9%)	16 (1.2%)	1344 (100.0%)
Not Confirmed/No Second Consultation	9 (7.0%)	10 (7.7%)	106 (82.2%)	4 (3.1%)	129 (100.0%)
Not Confirmed/ Confirmed on Second Consultation	45 (78.9%)	4 (7.0%)	7 (12.3%)	1 (1.8%)	57 (100.0%)
Not Confirmed/Denied On Second Consult.	14 (45.2%)	1 (3.2%)	15 (48.4%)	1 (3.2%)	31 (100.0%)
Special Consideration	136 (76.4%)	14 (7.9%)	22 (12.3%)	6 (3.4%)	178 (100.0%)
Cancelled	45 (20.9%)	15 (7.0%)	151 (70.2%)	4 (1.9%)	215 (100.0%)
TOTAL	1384 (70.8%)	90 (4.6%)	448 (22.9%)	32 (1.6%)	1954 (99.9%)*
- - -CENTRAL MASS. HCF- - -					
Confirmed	352 (88.9%)	6 (1.5%)	33 (8.3%)	5 (1.3%)	396 (100.0%)
Not Confirmed/No Second Consultation	2 (5.7%)	2 (5.7%)	31 (88.6%)	0 (0.0%)	35 (100.0%)
Not Confirmed/ Confirmed on Second Consultation	18 (64.3%)	1 (3.6%)	8 (28.3%)	1 (3.6%)	28 (100.0%)
Not Confirmed/Denied On Second Consult.	4 (28.6%)	1 (7.1%)	8 (57.2%)	1 (7.1%)	14 (100.0%)
Special Consideration	34 (87.2%)	3 (7.7%)	2 (5.1%)	0 (0.0%)	39 (100.0%)
Cancelled	6 (17.1%)	1 (2.9%)	25 (71.4%)	3 (8.6%)	35 (100.0%)
TOTAL	416 (76.1%)	14 (2.6%)	107 (19.5%)	10 (1.8%)	547 (100.0%)
- - - COMBINED FOUNDATIONS - - -					
Confirmed	1487 (85.5%)	53 (3.0%)	180 (10.3%)	21 (1.2%)	1740 (100.0%)
Not Confirmed/No Second Consultation	11 (6.7%)	12 (7.3%)	137 (83.5%)	4 (2.4%)	164 (99.9%)*
Not Confirmed/ Confirmed on Second Consultation	63 (74.1%)	5 (5.9%)	15 (17.6%)	2 (2.4%)	85 (100.0%)
Not Confirmed/Denied On Second Consult.	18 (40.0%)	2 (4.4%)	23 (51.1%)	2 (4.4%)	45 (100.0%)
Special Consideration	170 (78.3%)	17 (7.8%)	24 (11.1%)	6 (2.8%)	217 (100.0%)
Cancelled	51 (20.4%)	16 (6.4%)	176 (70.4%)	7 (2.8%)	250 (100.0%)
TOTAL	1800 (72.0%)	104 (4.1%)	555 (22.2%)	42 (1.7%)	2501 (100.0%)

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*Discrepancies due to rounding.

and disc/spinal fusion procedures. However, since only 19 of the 232 confirmed cases not having CPES surgery were conditional confirmations, those cases cannot explain the majority of confirmed patients not having CPES surgery.

Two thirds of all patients not confirmed by the first consultant do not have CPES surgery. However, the surgery choice of these patients is clearly related to whether they have a second consultation and the recommendation of the second consultant. Eighty-four percent of the patients not confirmed and not having a second consultation forgo any surgery, compared to 18 percent of the patients nonconfirmed and then confirmed, and 51 percent of those not confirmed twice. Seven percent of the patients (12 cases) not confirmed having no second consultation had a related surgery, and 7 percent (11 patients) had the CPES surgery in violation of program regulations, which require the second consultation if the first disputes the need for the proposed surgery.

Patients approved on the second consultation are more likely to have the proposed surgery than those not confirmed (74 percent against 40 percent). Eighteen patients received nonconfirmations on both consultations, but decided to follow through with the CPES surgery. These cases account for less than 1 percent of all patients having at least one consultation and represent a group that intends to have surgery regardless of the consultants' recommendations.

b. Patients Granted Special Considerations. Seventy-eight percent of the patients granted special consideration have the proposed CPES surgery and an additional 8 percent have a related surgery. Since most special considerations were granted for medical necessity, it was expected that most would have the CPES surgery. Some incidence of related surgery on this group was also anticipated, since the surgeon frequently requests approval to perform the surgery if the results of a preliminary diagnostic surgical procedure (arthroscopy, laparoscopy, or myleography) confirm the need for surgery.

In Bay State, 12.3 percent of the special considerations (22 cases) had no surgery, and half of these cases were patients proposed for hysterectomies and granted a special consideration for medical necessity. In Central Mass., two patients given special considerations for medical reasons did not have any surgery (one proposed for hysterectomy, one for disc surgery).

Since special consideration cases are waived from requiring a second opinion, there is no reason to expect that the program affected the patient's surgery decision. Nor does it seem likely that the proposing surgeon would alter his/her behavior because of the foundation's review of the operative/ pathology reports to determine if the special consideration was justified.

c. Patients Who Cancel. Seventy percent of patients who cancel out of the program do not have a CPES procedure, 6 percent have a related procedure, and 20 percent have a CPES procedure in apparant violation of program regulations. Those who cancel as "never shows" and have the CPES surgery are the most likely group of cancellations to be in violation of the program; only 17 never show patients (5 percent of all never shows), all in Bay State, fall into this category.

D. Discussion of Findings

In this section, the findings presented in the preceding sections of the chapter are integrated to examine three areas of particular interest to policy makers designing similar types of second opinion programs: the efficiency of CPES operations, the effect of CPES on the surgery decisions of program participants, and the characteristics of the procedures included in the CPES.

1. CPES Efficiency. The analysis of program participants includes several measures of CPES efficiency: the volume of cases handled relative to administrative staff; the percent of cancellations; the length of time required to complete

program requirements and the number of cases that have CPES surgery in violation of CPES regulations.

The volume of cases referred to the foundation is controlled by proposing surgeons who initiate the CPES process. The number of referrals per 1,000 eligible population was 1.4 times as great in Central Mass. (12.3 referrals per 1,000) as in Bay State (8.5 referrals per 1,000 population). This difference was anticipated from the analysis of 1976 surgery rates, which indicated that Central's rate of surgery for CPES procedures was 1.8 times greater than Bay State's.

In Central Mass. HCF, patients with no missed appointments had their consultations in two weeks (on average), while at Bay State, the mean length of time was more than three weeks. The ratio of consultants to consultations is the same for both foundations (1 : 6), so either Bay State consultants have a longer waiting period for appointments or Bay State's staff does not process the referrals as quickly. At Bay State, it also takes two days longer to send letters to the proposing surgeon and patient after the consultation (8 days versus 6 at Central Mass.), which may be accounted for either by the consultant's delay in returning the form or by the foundation taking longer to send the letters out once the consultant form is received.

Both foundations have a problem with patients missing their appointments: 11 percent (54 cases) at Central Mass. and 10 percent (153 cases) at Bay State missed at least 1 appointment before the first consultation. There were an additional 133 cases in Bay State and 19 cases in Central Mass. that never showed for an appointment and were thereby cancelled from the program. The director of CPES at DPW expressed interest in having the foundations follow up more on these patients to determine why they drop out of the program.

At least 32 referrals* in both foundations had CPES surgery without completing program requirements, representing one type of program slippage and accounting for 1 percent of the total number of referrals. Of this apparent slippage, 66 percent (21 patients) cancelled as "never shows" and had the surgery; 34 percent (11 patients) were denied on the first consultation, did not have a second consultation, and had the CPES surgery.

A more serious type of program slippage involves persons who are never referred to a foundation and have a CPES surgery. Project staff was able to make some estimate of this by comparing a list of all CPES surgeries billed to Medicaid** from June 1977 through December 1978 to a list of program participants in the Bay State and Central Mass. HCFs during a period when the CPES was operational in each area (18 months (June 1977 - December 1978) in Bay State, and 15 months (October 1977 - December 1978) in Central Mass.).

During these time periods, approximately 300 nonemergency cases were found to have had surgery that were not among the study period's CPES referrals. Thirty percent of these cases were estimated to have been referred in a period prior to the study period (March/April 1977 at Bay State, September in Central), given that their surgery dates were early in the study period. This leaves approximately 210 cases that should have been referred to the CPES, which would have increased total referrals by about 8 percent. DPW is in the process of tracking all 300 cases to determine which were actually referred in a month prior to the study period and to recover the money paid out to providers on cases that did not complete the CPES. Given that there was no real enforcement of the CPES during the study period and that some providers may not have known of the CPES requirements during its first year, an overall slippage of 9 percent does not seem extraordinary.

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* Some of the remaining 45 patients who cancel may also be in violation of the program if their reason for cancellation was not related to program eligibility or an emergency admission.

** Excluding nonapplicable categories of assistance.

In general, based on study findings and observations of the program, it appears that the Massachusetts second opinion program operates fairly smoothly. Approximately ninety percent of the CPES surgery claims submitted to Medicaid were accounted for by patients who completed the CPES process. It takes on average a month for a patient to complete the process, and most patients have the surgery within a month of the program completion date. A total of 351 consultants were used during the study period; 270 in Bay State and 81 in Central Mass. Both foundations and DPW staff reported that questions/complaints from the patients and physicians were minimal after the first few months of program implementation.

2. The Effect of CPES on Patient Surgery Decisions. About one quarter of the patients (659) referred to the CPES program had not had the originally proposed surgery by 31 December 1978. A rigorous assessment of CPES impact on surgery decisions would require follow-up of all no-surgery cases to determine why the decision against surgery was made. This was not done because of resource constraints. Therefore, various assumptions are made about which patients did not have surgery as a result of program requirements and program participation (the direct program effect).

Patients given special consideration are assumed not to be affected in their surgery decision since these patients have no direct contact with the program. Also excluded are patients who cancel because they were not eligible or not required to participate (patients with other insurance, cases proposed for not covered procedures, etc.). The program effect on the surgery decisions of the remaining individuals referred to the foundation are hypothesized as follows:

1. Cases that cancel because they never show for a consultation.

   Patients in this category may be deterred from CPES surgery because they are unwilling to obtain a second opinion and the proposing providers are unwilling to perform a CPES surgery for which they are subject to a disallowance because of CPES regulations (a "barrier" effect).

2. Cases confirmed for surgery.

   This category has the highest percentage of cases having CPES surgery. Individuals in this category not having CPES surgery may decide to have a related surgery based on the consultant's recommendation; may decide against any surgery as a result of options presented to them by the consultant; or may decide against surgery as a result of more time to consider the surgery because of CPES involvement. If these patients had no interest in having the CPES procedure prior to their consultation, they could have cancelled out.

3. Cases not confirmed for surgery on the first consultation.

   - Patients not confirmed that have no other consultation may be deterred from CPES surgery as a result of the negative opinion and requirement for another opinion.
   - Patients not confirmed on both consultations are considered to be deterred from CPES surgery by the two negative opinions. (Patients not confirmed and having a CPES surgery anyway appear not to be affected by the program at all.)
   - Patients not confirmed by the first consultant but confirmed by the second consultant receive conflicting messages from program involvement. They are less likely to have CPES surgery than those approved by the first consultant, but more likely to have surgery than those denied twice.

A maximum estimate of the direct program effect of CPES attributes all of the forgone CPES surgeries of patients in the above three categories to the program. This maximum estimate includes 557 forgone surgeries, or 85 percent of the total number of forgone CPES surgeries of all foundation referrals (659) as direct program effect. This estimate includes 232 confirmed patients, 194 nonconfirmed patients, and 131 never show patients who forgo a CPES procedure. Table 22 presents the number of forgone surgeries attributed to the CPES under the maximum estimate by procedure and foundation.

The minimum estimate of CPES impact on surgery assumes only that a portion of those not confirmed and not having CPES surgery were truly deterred from surgery by the program. The consultant's non- confirmation of the need for surgery is assumed to be the motivating force in the decision against CPES surgery, but

Table 22

MAXIMUM ESTIMATE OF THE NUMBER OF FORGONE CPES SURGERIES BASED ON PATIENTS REFERRED TO THE PROGRAM

Procedure	Bay State	Central Mass.	Combined Foundations
T&A	160	46	206
Hem	16	1	17
Chol	27	5	32
Meni	45	6	51
SMR	33	26	59
VV	23	7	30
Hyst	113	14	127
SF/Disc	31	4	35
TOTAL	448	109	557

some of the denied cases are eliminated, based on an assumption that some of these patients would not have had the surgery in the absence of a CPES. The percentage of approved cases that do not have a CPES or related surgery for each procedure (about 10 percent over all procedures) is used to estimate the portion of denied cases that do not have surgery which would not have had surgery without a CPES. This calculation results in elimination of 17 of the 194 nonconfirmed/no surgery cases or an estimated savings of 177 surgeries. Table 23 presents the minimum estimate by procedure and foundation.

Table 23

MINIMUM ESTIMATE OF THE NUMBER OF FORGONE SURGERIES BASED ON PATIENTS REFERRED TO THE PROGRAM

Procedure	Bay State	Central Mass.	Combined Foundations
T&A	41	27	68
Hem	1	0	1
Chol	4	0	4
Meni	17	1	18
SMR	10	7	17
VV	4	1	5
Hyst	43	8	51
SF/Disc	10	3	13
TOTAL	130	47	177

Savings associated with the minimum and maximum estimate of the direct effect of CPES on patients referred to the program are presented in Chapter VII.

3. Selection of Appropriate Procedures for Coverage Under a Second Opinion Program.

A number of procedure-specific findings from this analysis of the Massachusetts Consultation Program for Elective Surgery can be used in selection of appropriate procedures to be covered under future second opinion programs. Cost/benefit ratios by procedure, based on both the analysis of surgery rates and the 2501 referrals will be presented in Chapter VII. The following discussion looks at some of the factors that affect the cost/benefit ratios.

All second opinion programs have focused on elective surgery. The definition used by McCarthy and Finkel (1978) is appropriate to the Massachusetts CPES:

> Elective surgery is defined as operations or surical procedures which are not considered to be emergency or life threatening, and are subject to the choice or decision of the patient and physician.

Within the broad category of elective surgery, eight procedures were selected for inclusion in the Massachusetts program, based in part on estimated volume and average cost. T&A, the highest volume procedure, has the lowest average cost, while spinal fusion/disc surgery, a relatively low volume procedure, has the highest average cost. Cholecystectomy and hysterectomy rank high on both volume and average cost. The ranking of procedures by relative volume of referrals to Bay State and Central Mass. is presented in Table 24.

If the operating program has slack capacity, however, additional procedures may be added without additional cost to expand the objective of providing information to patients about their proposed surgery, if the procedure can be expected to break even.

The importance attached to having the surgery by both the physician and patient should also be taken into account. There are two factors that indicate

Table 24

RANKINGS OF PROCEDURES BY VOLUME AND AVERAGE COST
BAY STATE AND CENTRAL MASS HCFs

RANKING BY VOLUME				RANKING BY COST			
Bay State HCF		Central MA HCF		Bay State HCF		Central MA HCF	
Procedure	%	Procedure	%	Procedure	$	Procedure	$
T&A	37.3%	T&A	51.7%	Disc/SF	$4469	Disc/SF	$3367
Hyst	27.6%	Hyst	12.1%	Chol	2716	Hyst	2078
Chol	10.3%	SMR	11.9%	Hyst	2549	Chol	1912
SMR	7.1%	Chol	9.7%	Meni	1950	Meni	1401
Meni	5.5%	Disc/SF	5.5%	Hem	1641	VV	1313
Disc/SF	5.4%	Meni	4.4%	VV	1616	Hem	1285
VV	4.5%	VV	3.1%	SMR	1188	SMR	883
Hem	2.3%	Hem	1.6%	T&A	592	T&A	534

the importance surgeons attach to specific procedures based on the case mix referred: the approval rate and the rate of special considerations. The ranking of procedures based on these indicators is presented in Table 25, for Bay State and Central Mass. The rankings by approval rate do not reflect consultant feelings about the importance of a particular individual having a given procedure, but do provide an indication, based on the mix of cases referred, of procedures where there is disagreement over the necessity of CPES surgery between the consultant and proposing surgeon. In Bay State, the two procedures involving orthopedics (disc/spinal fusion and menisectomy) involve the lowest approval rate; hysterectomy cases also involve substantial disagreement. In Central Mass., there is most disagreement over the need for disc/spinal fusion, hysterectomy and submucous resections. Cholecystectomies had the highest approval rate in both areas.

The rate of special considerations reflects the proposing surgeon's assessment of the seriousness or need to proceed in a timely fashion of individual cases proposed for a CPES surgery. Disc/spinal fusion, hysterectomy, and cholecystectomy cases have the highest rate of special considerations granted;

Table 25

RANKING OF PROCEDURES BY RATE OF CONFIRMATION AND RATE OF SPECIAL CONSIDERATIONS GRANTED, BAY STATE AND CENTRAL MASS HCFs

APPROVAL RATE				SPECIAL CONSIDERATION RATE			
Bay State HCF		Central MA HCF		Bay State HCF		Central MA HCF	
Procedure	%	Procedure	%	Procedure	%	Procedure	%
Chol	94.5%	Chol	100.0%	Disc/SF	28.6%	Hyst	24.2%
T&A	91.4%	Meni	95.6%	Hyst	18.9%	Disc/SF	23.3%
Hem	91.4%	VV	92.9%	Chol	10.4%	Chol	17.0%
VV	90.7%	Hem	87.5%	Meni	8.3%	Hem	11.1%
SMR	84.6%	T&A	84.8%	VV	6.9%	Meni	8.3%
Hyst	77.6%	SMR	78.2%	Hem	4.4%	SMR	1.5%
Disc/SF	75.8%	Hyst	68.9%	T&A	1.0%	T&A	1.1%
Meni	71.3%	Disc/SF	68.2%	SMR	0.7%	VV	0.0%

T&A and submucous resection cases are seldom held to be serious enough to waive the second opinion consultation.

The interpretation of these indicators, given in particular the reversal in ranking for hysterectomy and spinal fusion/disc cases, can be explained by the fact that the approval rate indicates a degree of necessity based on all cases referred, while the special consideration rate reflects a percent of referrals that are most serious/most necessary cases. Apparently, some disc and hysterectomy cases are judged very necessary, although there are a high percentage of patients referred for these procedures for which there is a discrepancy of opinion on the need for surgery.

The importance that the patient attaches to having a particular CPES surgery can be assessed by examining the percentage of never shows, the percentage of those who are denied on the first consultation who have a second, and the percentage of approved cases that have surgery. The ranking of procedures by these indicators is presented in Table 26.

Table 26

RANKING OF PROCEDURES BY PERCENT OF PATIENTS WHO NEVER SHOW, THOSE NOT CONFIRMED AND HAVING A SECOND CONSULTATION, AND THOSE APPROVED HAVING THE PROPOSED SURGERY

Bay State HCF

Percent Never Shows (low to high)		Percent Denied Having Second Consult (high to low)		Percent Approved Having Surgery (high to low)	
Procedure	#	Procedure	#	Procedure	#
VV	1	Disc/SF	1	T&A	1
Chol	2	Chol	2	SMR	2
Hyst	3	SMR	3	Chol	3
T&A	4	Hyst	4	Hyst	4
Meni	5	VV	5	VV	5
Disc/SF	6	Hem	6	Hem	6
SMR	7	Meni	7	Disc/SF	7
Hem	8	T&A	8	Meni	8

Central Mass. HCF

Percent Never Shows (low to high)		Percent Denied Having Second Consult (high to low)		Percent Approved Having Surgery (high to low)	
Procedure	#	Procedure	#	Procedure	#
Meni	1	Meni	1	T&A	1
Hem	2	Hem	2	Disc/SF	2
Disc/SF	3	Disc/SF	3	Chol	3
T&A	4	SMR	4	Hem	4
Hyst	5	Hyst	5	Hyst	5
Chol	6	T&A	6	SMR	6
SMR	7	VV	7	Meni	7
Hem	8	No Chol denied cases		VV	8

Procedures ranked highest are those where the factor indicates patient interest in having surgery, i.e., low cancellation rate, high portion of those denied having second consultations, and high percentage of those approved having surgery.

In Bay State, patients proposed for cholecystectomy, hysterectomy and T&A surgery are most serious about proceeding. Those procedures taken least seriously are hemorrhoidectomies and menisectomies. In Central Mass., there was less agreement between rankings, although hemorrhoidectomies and spinal fusion/disc surgeries ranked in the upper half of all three indicators, and varicose vein excisions ranked in the lower half of all three indicators.

CHAPTER V. ANALYSIS OF CPES SURGERY RATES

This chapter presents a detailed account of the methodology used to perform the surgery rate analysis and the findings relative to the impact of CPES on the monthly surgery rates of the population covered by the program. Section A explains the characteristics of the interrupted time series design and the steps of the analysis. In Section B, the findings of this analysis are presented, indicating the impact of the CPES program on surgery rates through minimum and maximum estimates, and noting which trends were or were not statistically significant. Finally, Section C discusses the inferences that can be drawn from analysis of pre- and post-CPES surgery rates.

A. Methodology

An interrupted time series design (Campbell & Stanley/1963; Campbell/1969; Glass *et al.*/1975) was used to determine if monthly surgery rates declined following implementation of CPES. This design is characterized by:

a. the existence of periodic measurements over some time interval - i.e., a time series;

b. an intervention that occurs during the period of observation such that it divides the period into a pre-intervention period and a post-intervention period;

c. analysis to determine if there is a significant change between the pre-intervention and post-intervention period - that is, an interruption in the time series;

d. if a significant interruption is detected, consideration of "plausible rival hypotheses" other than the intervention that might have accounted for the interruption.

1. Data.

The time series consist of monthly surgery rates per 100,000 population for each procedure covered by the program for each of the five HCFs. Thus, forty time series, one for each surgery/HCF combination, were considered. For each series, surgery rates were available for a forty-four month period, from May 1975 (the earliest date of complete data from the Medicaid billing system) to December 1978 (the latest date that could be considered without the possibility of significantly under-counting surgery due to delays in billing).

CPES was implemented in each of the HCFs at different times. The post-CPES period was assumed to start the first full month after implementation of the mandatory program.*

2. Analysis. It was initially assumed that the effect of the CPES would be to lower the level of monthly surgery rates. This model, referred to in the subsequent discussion as the "drop" model, is illustrated in Exhibit XIII. Prior to implementation of CPES, monthly surgery rates fluctuate around some fixed mean level. After CPES, surgery rates fluctuate around a lower level.

To evaluate the impact of CPES, the change in level from the pre-CPES to the post-CPES period (which may be either an increase or decrease, despite the name "drop" model) was analyzed to determine if it was statistically significant, that is, sufficiently large to conclude it was not due just to random fluctuations. If monthly surgery rates were independent, this analysis was performed using an ordinary t-test.

Often in time series, successive observations are not independent but autocorrelated, that is, observations are correlated with preceding observations. Since the t-test is sensitive to autocorrelation, the time series were first analyzed to see if autocorrelation was present.** If autocorrelation was present, an appropriate model of the autoregressive -integrated -moving-average form was chosen (Box & Jenkins/1970). The statistical significance of a change in level

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* The pre-CPES and post-CPES periods (in months) for each of the HCFs were:

	Pre-CPES	Post-CPES
Western Massachusetts	1-34	35-44
Central Massachusetts	1-29	30-44
Charles River	1-37	38-44
Bay State	1-22	23-44
Southeastern Massachusetts	1-37	38-44.

** This was done by examining autocorrelation and partial autocorrelation coefficients and the Q statistic (Box & Pierce/1970; Ljung & Box/1978).

was then tested using the procedure proposed by Box and Tiao (1965). Basically, this amounts to performing an ordinary t-test after allowing for correlation among the observations.

Appendix 17 lists those surgery/HCF combinations in which there was evidence of autocorrelation in monthly surgery rates, and for each case, the model used to represent the correlation.*

An assumption of the t-test is that observations are normally distributed. Because of low surgery rates, the assumption of normality did not seem valid for the following procedures in Charles River:** menisectomy; hemorrhoidectomy; disc/spinal fusion; and varicose vein excision. In the first three of these cases, there was no evidence of autocorrelation in the series. Thus, a Mann-Whitney U-test was used to evaluate the impact of CPES. In the last case (varicose vein excision), observations appeared to be autocorrelated. In this case, no statistical test of the impact of CPES was performed.

In all cases where a decrease in level was statistically significant at a .05 level (using a one tail test), CPES was initially considered to have had an impact on surgery rates.

3. Plausible Rival Hypotheses. For those cases in which there was a statistically significant change in the level of the series concurrent with CPES, two types of plausible rival hypotheses were considered. The first type of rival hypothesis is that the drop model is correct but the interpretation of the cause of the drop is incorrect. That is, the drop in level occurred but was not a result of the CPES.

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* It should be noted that analysis of the time series graphs and autocorrelation coefficients gave no indication of seasonal patters for any surgery-HCF combination.

** For cases in which observations were independent, a Kolmogrov-Smirnov test was performed. In the first three cases, normality was rejected at a .05 level.

For Central Massachusetts and Bay State HCFs, this possibility could be evaluated because CPES was implemented earlier in these two areas than in the other three HCFs. Thus, the other three HCFs could be combined and considered as a nonequivalent control group. Monthly surgery rates for the combined area of Western, Southeastern and Charles River HCFs were calculated. This time series from month 1 to month 34 (a period in which CPES was not yet implemented in any of these HCFs) was analyzed to determine if a statistically significant change in the level of monthly surgery rates occurred concurrently with implementation of CPES in Central Mass. and Bay State. If such a change occurred, it suggests that the drop in Central Mass. and Bay State may have been due to some factor other than CPES. If no statistically significant change occurred, it supports the conclusion that the change in Central Mass. and Bay State was the result of CPES.

The second plausible hypothesis considered was that the drop model was incorrect, rather there was a declining trend in surgery rates during the study period due to a variety of factors not related to CPES.* If this were the case, the pre-CPES level of surgery would appear significantly higher than the post-CPES level. But it would be incorrect to attribute the change in level to the program. This is illustrated in Exhibit XIII. The pre-intervention level is higher than the post-intervention level, but the program seems to have no impact. This type of model will be referred to as the "trend" model.

To decide whether the drop or the trend model was more in accord with the data, the time series were analyzed for evidence of a trend prior to CPES implementation. To do this, a straight line was fit to the pre-CPES data using ordinary least squares, or, when there was evidence of first order serial correlation, the Cochrane-Orcutt technique was used. If the regression coefficient was significant, the trend model was considered a plausible rival hypothesis.

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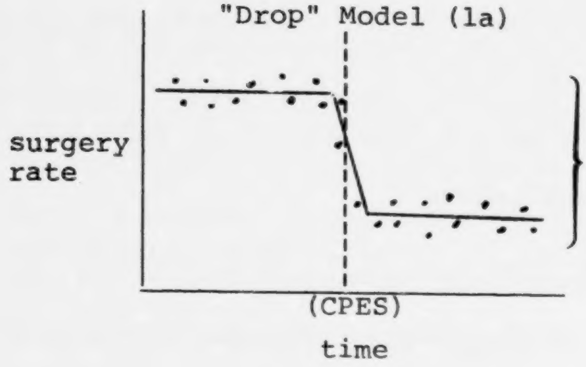
* E.g., a declining number of surgeons participating in Medicaid, PSRO review, etc.

Exhibit XIII

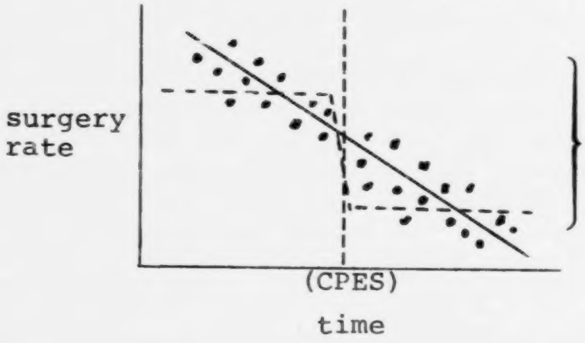
MODELS OF THE EFFECT OF CPES

"Drop" Model (1a)



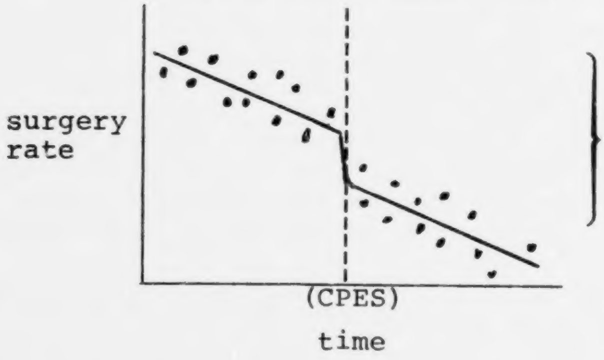
drop in level concurrent with program implementation

"Trend" Model (1b)



observed drop in level is an artifact resulting from the declining trend

"Trend-Drop" Model (1c)



drop concurrent with program implementation

If there was evidence of a trend in the pre-CPES data, a combination "trend-drop" model was considered (Exhibit XIII), that is, a model with declining surgery rates and a drop (or change in the y-intercept) that occurred concurrently with implementation of CPES.*

In summary, for Central Mass. and Bay State HCFs, three factors were examined in order to determine program impact:

1. was there a significant drop (.05 level) in the level of monthly surgery rates concurrent with CPES?
2. was there any indication of a trend prior to implementation of CPES?
3. was there a significant drop in surgery rates in the control group?

For the other three HCFs, only the first two factors apply.

4. Consideration of a Fee Cut. The analysis of the effect of CPES was complicated by the fact that during the pre-CPES period (specifically in February 1976, month 10 of the study period), the Massachusetts Medicaid program reduced the reimbursement fee for all surgery by 30 percent. If this fee cut had an effect on surgery rates, only surgery rates for months after the effect of the fee cut had been fully realized should be used in order to obtain a nonbiased estimate of the pre-CPES level of monthly surgery rates. Thus, before evaluating the impact of CPES, the effect of the fee cut on monthly surgery rates was analyzed. For this analysis, the time series consisted of the pre-CPES period for each surgery/HCF combination. The intervention was the fee cut. The pre-fee cut period was from month 1 to month 9, and the post-fee cut period from month 10 to the month prior to implementation of CPES.

To evaluate the impact of the fee cut, the same approach described for analysis of the CPES was used; that is, if observation were independent, a t-test was used, while if autocorrelation was present, the appropriate model was fit to the data and the statistical significance of the change in level examined. If the change in level was statistically significant at a .10 level (using a two-tail test), the fee cut was assumed to have had an effect on surgery rates. In cases in which the fee cut had an effect on surgery rates, the analysis of the impact of CPES was performed both with and without pre-fee cut data included.*

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* A more general form of the "trend-drop" model would permit the slope to change after CPES. However, there was little evidence from graphs of the time series to suggest this pattern.

Appendix 18 shows the level of surgery rates in the nine months before the fee cut and the level from month 10 to the months prior to implementation of CPES (the post-fee cut period). Appendix 19 shows the p value for the null hypothesis that the fee cut did not effect the level of surgery rates. If the p value is .10 or less, the null hypothesis was rejected.

Appendix 20 lists those surgery/HCF combinations in which the fee cut had a statistically significant impact on surgery rates. Though the fee cut had an effect on every CPES procedure in at least one HCF region, there was no consistent effect either on any procedure or in any region. In most cases, the level of surgery rates decreased after the fee cut. However, in some cases, the level increased.

Based on visual inspection of the graphs of the time series, it appears that the effect of the fee cut in some cases may have taken up to six months to be fully realized. From the graphs, the delay associated with the full impact of the fee cut was estimated. Appendix 20 shows the estimated last month before the full impact of the fee cut was realized. When the analysis of the impact of CPES was performed with the pre-fee cut data eliminated, the data eliminated were from month 1 through the month indicated in Appendix 20.

In addition, Appendix 20 shows three cases in which the graphs of the time series suggested the fee cut may have had an impact, but for which the statistical test did not produce a significant result. In order to avoid biasing the analysis of the impact of CPES, these are included as cases in which the fee cut had an impact.* For those cases listed in Appendix 20, results are emphasized when the pre-cut data were eliminated.

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* An alternative approach to analyzing the effect of the fee cut would be to consider the time series with two interventions - the fee cut and CPES. This would have the advantage of using all the data, but the gain would be small since additional parameters would be required to adequately model the effect of the fee cut.

B. Findings

1. Impact of CPES on Surgery Rates. Table 27 shows the level of monthly surgery rates in each region before and after CPES implementation and indicates when the change in level is statistically significant.

Appendix 21 summarizes by surgical procedure the statistical analysis of the time series. Included for each procedure and HCF, as well as for the control, is an estimate of the change in monthly surgery rates that occurred concurrently with CPES, a 95 percent confidence interval for the change, and the p value for the change.**

2. Factors Used to Determine Minimum and Maximum Estimates of CPES Impact. Table 28 summarizes the statistical evidence used to determine whether CPES had an impact on surgery rates. Specifically, the table shows information pertaining to the following:

a) whether a statistically significant drop in surgery rates occurred concurrently with implementation of CPES (i.e., whether the p value associated with the drop was .05 or less. A low p value implies that the change in level from the pre-CPES period to the

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* The statistical test assumed that the fee cut had an abrupt impact. To the extent that there was a delay in impact, the ability of the test to detect a change is reduced, particularly given the small sample sizes. Hence the reliance here, as elsewhere, on visual inspection.

** The statistical tests used assume that variances pre-CPES and post-CPES are equal. The graphs of this data suggest that this assumption may not be met for all series. In cases where inequality of variances was suspected, an approximate t-test that allows for unequal variances was used. However, the results from this test were similar to those obtained using the ordinary t-test.

Table 27

THE LEVEL OF MONTHLY SURGERY RATES PER 100,000 MEDICAID POPULATION
PRE-CPES AND POST-CPES BY FOUNDATION

Procedure		Western	Central MA	Control** Central MA	Charles River	Bay State	Control** Bay State	Southeastern
T&A	PRE-I	99.98┐*	64.11┐*	90.10┐*	75.83	30.77┐*	86.91	80.84┐*
	POST-I	49.04┘	48.97┘	73.92┘	55.69	18.25┘	84.97	49.25┘
Hem	PRE-I	4.51	5.10┐*	4.13	3.97	2.76┐*	4.11	3.38┐*
	POST-I	3.32	3.40┘	3.01	2.15	2.11┘	3.72	1.90┘
Chol	PRE-I	12.16	15.79	12.89	8.93	9.01	13.65	15.85┐*
	POST-I	12.14	13.20	14.91	16.82	9.07	12.91	10.37┘
Meni	PRE-I	2.13	2.82	3.14	2.70	3.32┐*	2.83	3.88┐*
	POST-I	1.95	3.86	2.61	5.22	2.46┘	3.50	2.13┘
SMR	PRE-I	9.34┐*	13.68┐*	11.80	12.63	2.65	11.07	16.28
	POST-I	5.74┘	7.44┘	13.60	10.58	2.34	13.90	15.43
VV	PRE-I	4.65	4.23	4.30┐*	4.88	3.32┐*	4.24	3.30
	POST-I	3.23	3.39	2.75┘	3.15	2.39┘	3.71	1.70
Hyst	PRE-I	28.61┐*	15.41┐*	26.82	19.70┐*	17.10┐*	26.98	22.98┐*
	POST-I	19.67┘	11.73┘	24.09	9.49┘	13.10┘	25.37	16.51┘
Disc/SF	PRE-I	5.55	6.80	5.11	5.25	4.35	5.10	4.68
	POST-I	5.46	5.64	4.45	5.26	4.14	4.84	4.13

NOTE: Pre-fee cut data are eliminated for cases in which fee cut had an effect on surgery rates. See Appendix 22.

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* Indicates change in level is statistically significant .00 ≤ P<.05.

** Control (Central) shows the level of surgery rates in the control from month 1 through Month 29, a period before CPES was implemented in Central (pre-I) and from month 30 to Month 34, a period after CPES was implemented in Central (post-I); control (Bay State) shows the level of surgery in the control from month 1 to month 21, a period before CPES was implemented in Bay State (pre-I) and from month 22 to month 34, a period after CPES was implemented in Bay State (post-I).

Table 28

EVIDENCE TO SUPPORT GROUPINGS OF SURGERY/HCF COMBINATIONS

Surgery/ Foundations	P-Value Drop	P-Value Control	Trend in Pre-CPES Data	Group
Tonsillectomy/ Adenoidectomy				
Western Mass.	.00	-	significant	-*
Central Mass.	.00(.00)[1]	.00(.03)	significant	2*
Bay State	.00[2](.00)	.01(.42)	significant	1*
Southeastern	.03[2](.00)	-	significant	2*
Hysterectomy				
Western Mass.	.00	-	not significant	2
Central Mass.	.02	.15	not significant	1
Charles River	.01	-	not significant	2
Bay State	.00	.20	not significant	1
Southeastern	.00(.00)	-	significant	2*
Varicose Vein Excision				
Bay State	.02	.05(.23)	not significant	2
Menisectomy				
Bay State	.00	.62	not significant	1
Southeastern	.04	-	not significant	2
Hemorrhoidectomy				
Central Mass.	.13(.02)	.09	not significant	2
Bay State	.03	.27	not significant	1
Southeastern	.05	-	not significant	2
Submucous Resection				
Western Mass.	.14(.01)	-	not significant	2
Central Mass.	.00	.82	not significant	1
Bay State	.00(.22)	.98	not significant	2*
Cholecystectomy				
Southeastern	.04	-	not significant	2

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[1] Numbers in parentheses are the p value when pre-fee cut data are eliminated. This is the p value used to group the surgery/HCF combinations.

[2] P value for the trend/drop model.

* See discussion in Appendix 22

post-CPES period was sufficiently large that it was unlikely to have occurred by chance).

b) For Central Mass. and Bay State HCFs, whether no statistically significant drop in surgery rates occurred in the control concurrently with implementation of CPES in Central or Bay State; i.e., whether the p value associated with the drop in the control group was larger than .05. (This high p value provides evidence that nothing else affected the entire state such to cause the observed drop in Central Mass. or Bay State: it there was something else, it is likely a statistically significant drop would have occurred in the control.)

c) Whether the trend in the pre-CPES data was statistically significant. If the trend was not statistically significant, it indicates there was no evidence of a trend in the data prior to implementation of CPES; that is, the drop model seems valid and any overall visual trend during the entire study period is an artifact resulting from the change in level. If the trend is statistically significant, it suggests the observed drop may be an artifact that results from the general decline in monthly surgery rates during the entire period.

Based on the information in this table, plus visual inspection of each of the time series, the surgery/HCF combinations in which a statistically significant drop occurred were placed into one of two groups. The two groups are distinguished by the extent to which the statistical evidence and graphical patterns suggest program impact. In group 1 are those surgery/HCF combinations where evidence strongly indicates program impact; in group 2 are those cases where the evidence is less strong. Since there is more than one year of post-CPES data for only Central Mass. and Bay State, and since the control group exists only for these two HCFs, only Central Mass. and Bay State are considered candidates for group 1.

The last column in Table 28 shows the group within which each surgery/HCF combination is placed. In group 1 are mostly those cases in which the p value associated with the drop is .05 or less (when the pre-fee cut data are eliminated, if the fee cut had an impact), the p value associated with the control is greater than .05 (again when the pre-fee cut data are eliminated, if the fee cut had an impact), and the trend in pre-CPES data is not statistically significant. In

Appendix 22 are comments on those time series that were most difficult to interpret, and those that were exceptions to the general rules above.*

3. Minimum and Maximum Estimates of the Impact of CPES. Based on the grouping in Table 28, two estimates of the impact of CPES are made. The first estimate, which includes only those cases in group 1, is conservative, and is therefore labeled the minimum estimate. Excluded from this estimate are all procedures in Western Mass., Charles River and Southeastern Mass., where there are only 10, 7 and 7 months (respectively) of post-CPES data available, plus certain procedures in Central Mass. and Bay State where the evidence indicating program impact is less clear.

The minimal estimate of CPES impact was 603 fewer surgeries as a result of the program in the 12-month period after implementation. This represents a 20 percent reduction in surgeries from the previous 12-month period for the Bay State and Central Mass. regions. Table 29 presents the number of forgone surgeries by procedure and foundation included in this 603 figure. From this table, it is apparent that CPES had an impact on 4 of the 8 procedures in Bay State and on 2 of the 8 procedures in Central Mass.

Table 29

MINIMUM ESTIMATE OF THE NUMBER OF FORGONE SURGERIES ATTRIBUTABLE TO CPES BASED ON THE SURGERY RATE ANALYSIS FOR THE 12 MONTH PERIOD AFTER IMPLEMENTATION

Procedure	Bay State	Central Mass	Combined Foundations
Hysterectomy	115	20	135
Submucous Resection	-	33	33
Tonsillectomy/ Adenoidectomy	391	-	391
Menisectomy	25	-	25
Hemorrhoidectomy	19	-	19
TOTAL	550	53	603

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*Appendix 23 presents samples of the graphs of the time series.

The maximum estimate of the impact of CPES (i.e., considering all cases in both groups 1 and 2) includes procedures in all five HCF regions. This estimate projects 1139 fewer surgeries 12 months after CPES implementation, representing a 20 percent reduction in the number of surgeries *statewide*, as presented in Table 30.

Table 30

MAXIMUM ESTIMATE OF THE NUMBER OF FORGONE SURGERIES ATTRIBUTABLE TO CPES BASED ON SURGERY RATE ANALYSIS FOR THE 12 MONTH PERIOD AFTER IMPLEMENTATION*

Procedure	Western Mass.	Central Mass.	Charles River	Bay State	Southeastern Mass.	Total
T&A	0	82	0	391	168	641
Hem	0	9	0	19	12	40
Chol	0	0	0	0	45	45
Meni	0	0	0	25	14	39
SMR	29	33	0	9	0	71
VV	0	0	0	27	0	27
Hyst	71	20	17	115	53	276
Disc/SF	0	0	0	0	0	0
TOTAL	100	144	17	586	292	1139

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* 12-month figures for Western, Southeastern and Charles River areas estimated based on post-CPES surgery rate levels for available months of post-program data (10, 7 and 7 months respectively).

The minimum and maximum estimates of CPES impact differ by 536 operations. Forty-seven percent of this difference (250 operations) is accounted for by the addition of T&As in Central and Southeastern Mass. It is recognized that the minimum and maximum estimate both project a 20 percent decrease in the number of CPES procedures 12 months after program implementation. The difference is that the minimum estimate only projects this decrease for the Bay State and Central Mass. areas where there was a minimum of 15 months of post-CPES data included in the analysis. The maximum estimate relates to the entire state. It should also be recognized that the minimum estimate excludes 3 HCF regions where there are less than 12 months of post-CPES data. The maximum estimate includes those three areas and some additional procedures for Bay State and Central Mass. not included in the more conservative interprectation of CPES impact.

The impact of CPES on surgery rates varied by procedure. Table 31 presents the total number of CPES operations 12 months prior to program implementation in each site, the number of forgone surgeries attributable to the program (maximum estimate) and percentage reduction. Hysterectomies showed the greatest decline (26 percent), followed by hemorrhoidectomies and menisectomies (23 percent), and then T&As (22 percent). The only procedure with no indication of CPES impact was disc/spinal fusion.

The program's effect on the level of CPES operations also differed by region, as illustrated in the same table (31). CPES was most effective in reducing the level of surgery in Bay State (a 25 percent reduction), followed closely by Southeastern Mass. (24 percent), and Central Mass. (21 percent). The program's effect was significantly less in the other two areas, with an 8 percent reduction in the number of CPES operations in Western Mass. and a 7 percent reduction in Charles River. It is interesting to note that the program's effect on surgery rates did not seem related to the pre-CPES level of surgeries: Bay State had the lowest pre-CPES surgery rates and showed the greatest decline; Southeastern Mass. had the second greatest decline and the second highest pre-CPES rate of surgery.

Table 32 presents the surgery rates per 10,000 CPES population for each procedure in each foundation for calendar years 1976 to 1978, and the percentage change from 1976 to 1978. There was a statewide reduction in CPES surgeries of 31.5 percent over this time period. The maximum estimate of CPES impact attributes a 20 percent reduction in covered surgeries to

Table 31

PERCENTAGE CHANGE IN THE NUMBER OF CPES OPERATIONS BY PROCEDURE AND FOUNDATION BASED ON THE MAXIMUM ESTIMATE OF CPES IMPACT

Procedure/ Foundation	Number of Operations 12 Months Prior to CPES Implementation	Annual Number of Forgone Surgeries Based on Max. Est.	Percent of Change
- - - by procedure - - -			
Tonsillectomy/ Adenoidectomy	2878	641	22.3%
Hemorrhoidectomy	175	40	22.9%
Cholecystectomy	622	45	7.2%
Menisectomy	172	39	22.7%
Submucous Resection	429	71	16.6%
Varicose Vein Excision	196	27	13.8%
Hysterectomy	1054	276	26.2%
Disc/Spinal Fusion	254	0	0.0%
TOTALS	5780	1139	19.7%
- - - by foundation - - -			
Western Mass.	1275	100	7.8%
Central Mass.	703	144	20.5%
Charles River	229	17	7.4%
Bay State	2332	586	25.1%
Southeastern Mass.	1241	292	23.5%
TOTALS	5780	1139	19.7%

Table 32

SURGICAL PROCEDURE RATES PER 10,000 POPULATION FOR THE FIVE MASSACHUSETTS
HEALTH CARE FOUNDATIONS - 1976, 1977, 1978*

HEALTH CARE FOUNDATION AND YEAR

Surgical Procedure	Western MA HCF				Central MA HCF				Charles River HCF				Bay State HCF				Southeastern MA HCF				STATEWIDE			
	Av. Pop. 67,198				Av. Pop. 45,369				Av. Pop. 14,640				Av. Pop. 244,115				Av. Pop. 70,230				Av. Pop. 441,552			
	'76	'77	'78	%Δ*	'76	'77	'78	%Δ	'76	'77	'78	%Δ	'76	'77	'78	%Δ	'76	'77	'78	%Δ	'76	'77	'78	%Δ
T&A	130.5	110.3	61.9	-52.6	91.6	75.0	60.6	-33.8	74.6	106.8	65.3	-12.5	42.1	25.1	21.6	-48.7	109.1	102.6	71.5	-34.5	72.3	58.4	41.1	-43.2
Hem	7.2	3.9	4.1	-43.1	5.5	5.4	4.0	-27.3	4.7	6.7	2.9	-38.3	3.1	3.3	2.3	-25.8	4.1	4.5	2.8	-31.7	4.2	3.9	2.8	-33.3
Chol	15.1	15.3	14.6	-3.3	19.6	16.5	17.3	-11.7	10.7	12.7	15.8	+47.7	11.4	10.1	11.1	-2.6	18.2	16.6	14.9	-18.1	13.9	13.2	13.0	-6.5
Meni	2.5	3.5	2.0	-20.0	4.4	4.8	4.5	-2.3	1.3	4.7	4.3	+230.8	3.8	3.4	2.7	-28.9	5.0	5.3	2.8	-44.0	3.8	3.9	2.8	-26.3
SMR	8.7	11.1	8.1	-6.9	19.6	12.8	9.2	-53.1	14.0	18.0	14.4	+2.9	4.2	2.8	2.8	-33.3	18.6	19.4	21.7	+16.7	9.1	8.3	7.6	-16.5
VV	4.8	5.6	3.8	-20.8	5.1	5.0	4.0	-21.6	5.3	6.7	5.0	-5.7	3.9	2.8	3.0	-23.1	5.2	3.6	2.3	-55.8	4.4	3.7	3.2	-27.3
Hyst	34.5	35.6	25.0	-27.5	18.5	18.2	13.9	-24.9	25.3	21.4	15.8	-37.5	20.6	16.9	15.1	-26.7	32.9	26.4	24.0	-27.1	24.6	21.6	17.9	-27.2
Disc/SF	5.8	6.9	6.8	+17.2	9.0	6.9	7.2	-20.0	8.7	4.0	5.7	-34.5	5.6	4.3	5.6	0.0	5.1	5.0	6.0	+17.6	6.0	5.8	6.0	0.0
TOTALS	209.1	192.2	126.2	-39.6	173.2	144.5	120.8	-30.3	144.6	180.9	129.2	-10.7	94.8	69.8	64.2	-32.3	198.1	183.6	145.9	-26.4	138.2	118.7	94.6	-31.5

$*\%\Delta = \frac{'78 - '76}{'76}$

* "Population" refers to the CPES-eligible population only.

the program over a similar period. This highlights the fact that not all reductions in CPES surgery were attributed to CPES. In fact, there are 15 procedure/HCF combinations where a decline occurred that were not included in the maximum estimate of CPES impact. Some declines were not attributed because the monthly drop in surgery rates after CPES was not statistically significant, some because the decline was part of a trend prior to CPES.

The declines in the Massachusetts CPES population are of a surprising magnitude given short term trends in surgery in other areas. Table 33 compares the change in surgery rates from 1976-1977 (the most recent available year for most areas) of the CPES population to the population nationwide, the New England region, and the total Massachusetts population. In half of the cases (T&A, hysterectomy, hemorrhoidectomy, and submucous resection), the decline in the CPES population was the most marked. (It is difficult to compare the absolute rates given the difference in age/sex distribution of the CPES population compared to the other three populations.)

C. Discussion

An analysis of surgery rates (or rates of proposed surgery) both before and after a second opinion program permits much stronger inferences about program effectiveness than merely monitoring post-SOP surgery rates. Examining only post-SOP surgery rates limits accurate analysis of program impact in two ways:

1. an observed decline of surgery rates may be attributed to an SOP when in fact it is a continuation of a pre-SOP trend in surgery (the declining trend model);
2. a constant level of surgery rates after SOP implementation may lead to a conclusion that the program has had no effect, when in fact a significant decline from a pre-SOP baseline period may have occurred (the drop model).

Table 33

SURGERY RATES PER 10,000 POPULATION FOR 1976 AND 1977 BY POPULATION AND PROCEDURE

	Procedures															
	T&A		Hem		Chol		Meni		SMR		VV		Hyst		SF/Disc	
Population	% '76	% Δ*	% '76	% Δ	% '76	% Δ	% '76	% Δ	% '76	% Δ	% '76	% Δ	% '76	% Δ	% '76	% Δ
UNITED STATES[1]	34.2	-2.5	9.7	-4.3	21.0	0.0	7.2	+8.5	11.9	+3.0	3.5	+4.6	32.2	+3.2	10.2	+0.6
NEW ENGLAND REGION[1]	27.2	-5.2	8.3	+1.2	22.6	-6.1	5.8	+1.9	13.7	-4.5	5.3	-27.3	24.0	-0.7	7.2	+20.3
MASSACHUSETTS[2]	29.2	-16.0	-	-	-	-	-	-	-	-	-	-	21.7	-6.0	-	-
CPES	72.3	-19.2	4.2	-7.1	13.9	-5.0	3.8	+2.6	9.1	-8.8	4.4	-15.9	24.6	-12.2	6.0	3.3

* $\% \Delta = \frac{'77-'76}{'76}$

1. Source: U.S., D.H.E.W., N.C.H.S., Vital and Health Statistics, Surgical Operations in Short-Stay Hospitals, U.S. Printing Office, 1976-1977.

2. Source: Office of State Health Planning, Mass. Department of Public Health.

This consideration of both pre-CPES and post-CPES rates has allowed identification of any statistically significant drop in surgery rates concurrent with implementation of CPES and whether any drops are artifacts resulting from a general decline in surgery rates due to factors other than CPES. Unfortunately, the fee cut during the pre-CPES period made it difficult in some cases, notably T&As, to conclude from the pre-CPES data whether there was a downward trend prior to CPES (evidence supporting the trend model) or just the appearance of a downward trend because of a drop in level resulting from the fee cut.*

The analysis of surgery rates in Bay State and Central Mass. was strengthened by using the other three HCFs as a nonequivalent control group. This permitted consideration of whether statewide factors other than CPES might have been responsible when a statistically significant drop was detected in Bay State and Central Mass. However, it is recognized that the control group may not be really independent: implementation of CPES in Central Mass. and Bay State, and knowledge that CPES was going to be implemented in the other areas, may both have had an effect on surgery rates in the other HCF areas (the control) before the program was actually implemented there (a spill-over effect). This pattern was most notable for T&As and hysterectomies in Western Mass., an area in which there were particularly active negotiation with physicians for at least six months before CPES implementation. The analysis interprets this decline in the control as evidence in support of a plausible rival hypothesis, when it may have been caused by CPES. In fact, with the one exception (T&As in Central Mass.), the drop in the control concurrent with CPES implementation in Central Mass. or Bay State was never statistically significant. Given the bias just discussed (the spill-over effect), this lends support to the conclusion that a statistically significant drop in Central Mass. or Bay State was not caused by some other factor that might have affected the entire state.

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* See discussion of graphs of the time series in Appendix 22.

One statewide program that may have affected surgery rates during the study period is the PSROs. The implementation period for the PSRO program in each HCF area is outlined below and contrasted with the dates during which CPES was implemented. (Table 34 contrasts implementation dates of the PSRO and CPES.) The PSRO program was as least as completely implemented in the control areas as it was in Central or Bay State.* So, if a drop in Central or Bay State was caused by the PSRO program in these areas, a similar drop in the control would be expected (assuming the PSRO program, once implemented, was at least as effective in the control areas as in the study areas). As previously mentioned, except for T&As in Central Mass., a statistically significant drop in the control was not observed. Hence, there is little evidence to indicate that the effect attributed to CPES in Central Mass. or Bay State was caused by the PSRO program.

Table 34

DATES DURING WHICH THE PSRO PROGRAM WAS BEING IMPLEMENTED

PSRO/HCF Area	Dates of PSRO Implementation	Dates of HCF Implementation
Western Mass.	April 1976 - January 1977	February 1978
Central Mass.	December 1976 - November 1977	August 1977
Charles River	October 1975 - March 1977	May 1978
Bay State	December 1975 - July 1977	March 1977
Southeastern Mass.	April 1976 - July 1977	May 1978

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*At the time CPES was implemented in Central Massachusetts, the PSRO program was established at all hospitals in the control area and at almost all hospitals in Central Mass.; at the time CPES was implemented in Bay State, the PSRO program was completely implemented in Western and Charles River, almost completely implemented in Southeastern Mass. and implemented in about 75 percent of the hospitals in Bay State.

The project's analysis of surgery rates did not provide for examination of the PSROs in the other three HCF areas.

Due to lack of independence between the control and Bay State and Central Mass and observed differences in surgery rates, the control group was not used to assess program impact by comparing changes in surgery rates in Bay State and Central Mass. to a change in the control or to identify a trend in surgery rates prior to CPES.

The interrupted time series approach used to analyze surgery rates is most suited to detect abrupt changes. Visual inspection of the graphs of the time series indicates that there is an immediate drop in the level of surgery rates for most procedures immediately after CPES implementation.* There is rarely a gradual decline following the initial drop and in no case did the surgery rates return to a pre-CPES level again after the drop. Thus, it appears that an abrupt change/drop model of CPES impact is reasonable for at least the short term, and that drops that occur are lasting (at least in Bay State and Central Mass., where there were 22 and 15 months of post-CPES data).

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* There was some delay in the declines for hysterectomy, hemorrhoidectomy, and submucus resection/rhinoplasty in Central Mass,, and hemorrhoidectomy in Bay State.

The variability in surgery rates make it difficult to detect small changes (under 20 percent) as statistically significant. Table 35 shows the approximate power of the t-test used to determine whether the change in rates from pre- to post-CPES periods is statistically significant (for those procedures in Central Mass. and Bay State in which independence of monthly rates could be assumed). As indicated, small gradual changes in the level of surgery are not likely to be detected and the analysis may therefore underestimate program benefits from some procedures.*

Table 35

APPROXIMATE POWER* OF THE TEST USED TO ANALYZE THE EFFECT OF CPES ON MONTHLY SURGERY RATES

Procedure	HCF	Percentage Change 10%	25%	50%	Percentage Change Such That Power Equals .50
Hyst	Central Mass.	.14	.58	.99	17%
Hyst	Bay State	.44	1.00	1.00	11%
Meni	Central Mass.	.06	.19	.59	44%
Meni	Bay State	.22	.84	1.00	16%
Hem	Central Mass.	.08	.31	.84	33%
Hem	Bay State	.13	.54	.99	24%
Chol	Central Mass.	.13	.56	.99	23%
Chol	Bay State	.21	.81	1.00	17%
SMR	Central Mass.	.12	.48	.97	26%
SMR	Bay State	.17	.73	1.00	19%
SF/Disc	Central Mass.	.07	.25	.74	37%
SF/Disc	Bay State	.14	.62	.99	21%

* To calculate power, the normal approximation to the non-Central t distribution has been used. Also, power is calculated with the pre-fee cut data included.

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*The power of the tests would be improved by combining data across HCFs to provide a pooled estimate of the variance. This was not done to avoid making any assumptions about equality of variances in the different HCFs, particularly given differences in the level of surgeries across HCFs.

The approach used may also overestimate the magnitude of the CPES effect because in cases where a statistically significant drop in the level of surgery was detected, the entire magnitude of the drop has been attributed to CPES. A causal model of surgery rates (using a multiple regression model) could incorporate a number of factors, along with CPES, that might have contributed to the decline. This type of model could help isolate what part of the total drop might be attributable to factors other than the CPES. This was not done because of limited resources and because the first priority was to determine whether or not there was a significant decline. Future studies can attempt to build such a model to explain the drop.

CHAPTER VI. HAS THE MANDATORY SECOND OPINION PROGRAM REDUCED THE RATE OF SURGERY IN THE MASSACHUSETTS MEDICAID PROGRAM?

A mandatory second opinion program was expected to reduce the rate of surgery by affecting the behavior of both patients and physicians. A primary objective of the CPES was to provide an opportunity for Medicaid patients to receive additional information about the necessity of a particular surgical procedure and the available options for treating the underlying medical condition that resulted in a proposed surgery. Surgeons have had to change their scheduling and admitting patterns for Medicaid patients to allow for the second opinion process.

The first part of this chapter examines how the CPES might have affected the observed changes in surgery rates, focusing first on the possible effects on patients decisions and then on physician decisions (including the sentinel effect). The last section examines the various estimates that have been presented on the magnitude of CPES impact and the general conclusions that can be drawn regarding the CPES impact on the level of surgery.

A. The Program's Effect on Patient Surgery Decisions

A mandatory second opinion program affects patient surgery decisions in several ways:

- the requirement to have a second opinion consultation (and another consultation if the first is negative) may discourage patients from having one of the covered procedures (the "barrier" effect);
- the time required to complete the program (approximately 1 month in the hands-on model areas) gives patients more time to consider the surgery decision;
- the information provided to the patient by the consultant may include medical and surgical alternatives to the proposed procedure and/or additional reasons as to why the proposed surgery is an appropriate/inappropriate treatment for the patient's symptoms/diagnosis.

As outlined in Chapter IV, various assumptions can be made about which patients referred to the program who forgo CPES surgery were influenced by the program itself. To summarize, patients who never show and do not have the surgery may be influenced by the barrier effect and patients who have consultations may be influenced in their surgery decisions by the consultants' remarks and/or the additional time to consider the surgery option. Whatever the reason, the pattern of surgery decisions is related to the patients' program disposition (cancellation; confirmation; nonconfirmation). Both a minimum and maximum estimate of the magnitude of the program's direct effect on patient surgery decisions were also presented in Chapter IV.

It should also be recognized that a second opinion program might increase surgery rates, if the majority of the referred patients are confirmed and if confirmed patients are more likely to have surgery than they would have, had there been no program. While the project was not able to test directly whether confirmed patients are more likely to have surgery than a similar group of proposed patients receiving no consultation, the surgery rate analysis indicates an overall decline in surgery rates.

B. The Program's Impact on Physician Decisions

A program requiring Medicaid patients to participate in a second opinion program prior to surgery could affect physician decisions regarding the covered surgical procedures. The following hypotheses about the program effect on physicians can be made:

- primary physicians will refer fewer patients for covered procedures as a result of publicity concerning the justification for including specific procedures in the program (such as large, unexplained variations in surgery rates and questions on the necessity for some procedures, such as T&As, disc surgeries, and hysterectomies, for some patients). If fewer patients are referred, it is likely that the case mix of patients referred to surgeons will change.

- Surgeons will propose fewer patients for the covered procedures, and recommend alternative procedures.
- Surgeons will propose fewer patients for covered procedures because of a sentinel effect (Grafe et al./1978), whereby knowledge that another physician will review the need for surgery will make the original surgeon more conservative in his proposing pattern.
- Surgeons will drop out of the Medicaid program to avoid compliance with second opinion program regulations.
- Surgeons will be unwilling to perform SOP procedures on Medicaid patients who have not completed the program because their claims would be subject to disallowance.

The project did not test these hypotheses directly because of limited resources. Project staff did attempt to examine whether there was a change in the number of Medicaid providers performing CPES operations between May 1975 and December 1978. This analysis was thwarted, however, by an increased use of group billing numbers by physicians over this period,* and the lack of information on the number of physicians using any one group billing number over the period, along with the problem of attributing any observed change to the CPES.

To summarize, the observed declines in CPES surgery rates imply some change in physician decisions regarding the eight covered procedures, but the project has not been able to isolate how this change came about.

C. The Magnitude of Forgone Surgeries Attributed to CPES

The project has made one statewide estimate of CPES impact on the volume of surgeries covered by the program, based on analysis of pre- and post-surgery rates described in detail in the previous chapter. This estimate attributes a 20 percent decrease in the number of CPES operations statewide 12 months after program implementation in each region. Hysterectomies declined by 26 percent, while menisectomies, T&As, and hemorrhoidectomies each declined by 22-23 percent. The only procedure showing no decline was disc surgery/ spinal fusion.

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* Had time and resources permitted an interrupted time series design could have been applied to data on the number of surgeons billing Medicaid for CPES surgery over the study period, to detect any changes occurring concurrent with CPES implementation.

Two of the three areas using a hands-on model had declines of 20 percent, the remaining area evidenced a 7 percent decline, but the small volume and large variability of surgery rates in this area (Charles River) along with limited post-CPES data, made it difficult to accurately assess the impact of CPES there.

The two areas using desk audit models also had less than 12 full months of post-CPES data to evaluate, making findings for these areas also preliminary. The data suggest, however, that the CPES effected a 24 percent decline in CPES operations in one area (Southeastern Mass.) and an 8 percent decline in the other (Western). The project's estimate of savings based on this statewide reduction, by foundation, is presented in the following chapter.

There are four different estimates of the number of forgone operations attributed to the CPES in Bay State and Central Mass., described below:

a. A minimum and maximum estimate of forgone surgeries attributable to the program, based on the surgery rate analysis. The difference between these two estimates is that the minimum estimate includes only those procedures where there is most evidence of program impact, while the maximum estimate adds to the minimum estimate several procedures where there is more limited evidence of program impact (see discussion on pages 118-127.)

b. A minimum and maximum estimate of forgone surgeries based on the analysis of program participants. The minimum estimate assumes that only a portion of the forgone operations on patients not confirmed on the first consultation are attributable to CPES; the maximum estimate assumes that all forgone surgeries by confirmed, not confirmed and no-show cancellations cases are attributable to CPES impact. (See discussion on pages 103-106.)

The number of forgone surgeries attributed to the program by each of these estimates is displayed in Table 36.

Table 36

ESTIMATES OF FORGONE SURGERIES ATTRIBUTABLE TO CPES
FOR BAY STATE AND CENTRAL MASS HCFs

	Bay State					Central Mass.				
	Total No. Procedures	Time Series		Referrals		Total No. Procedures	Time Series		Referrals	
Procedures	1978	Min	Max	Min	Max	1978	Min	Max	Min	Max
T&A	517	391	391	41	160	270	0	82	27	46
Hem	55	19	19	1	16	18	0	9	0	1
Chol	267	0	0	4	27	77	0	0	0	5
Meni	64	25	25	17	45	20	0	0	1	6
SMR	67	0	9	10	33	41	33	33	7	26
VV	73	0	27	4	23	18	0	0	1	7
Hyst	362	115	115	43	113	62	20	20	8	14
Disc	134	0	0	10	31	32	0	0	3	4
TOTALS	1539	550	586	130	448	538	53	144	47	109

Project staff have used these different estimates for two purposes: to assess the existence of a sentinel effect and to construct a "best" estimate of program impact.

1. The Sentinel Effect. As described earlier, the sentinel effect of a second opinion program refers to a decline in the level of proposed operations, resulting from a decrease in the number of patients referred to surgeons and/or a decrease in the number of proposing surgeons and/or a decrease in the amount of surgery proposed by individual physicians.

Ideally, the sentinel effect would be measured by comparing the rate of proposed surgery before and after implementation of a second opinion program. While the number of individuals referred to a second opinion program would approximate the number of persons proposed for surgery after the program,* a prospective study whould have been required to estimate the number proposed prior to the program's implementation.

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* Although some patients may be proposed by a surgeon but decide against surgery and ask not to be referred to the program, and some patients have the surgery without completing the program.

The estimated decline in the number of CPES operations based on the surgery rate analysis includes both any decline caused by a sentinel effect and the more direct program effect on patients referred to the program. Thus, to estimate the sentinel effect, the direct program effect should be subtracted from the total estimated decline. For Bay State and Central Mass., there are the minimum and maximum estimates of total program effect and the minimum and maximum estimate of direct program effect, which allow for corresponding minimum and maximum estimates of a sentinel effect:

- maximum sentinel effect = maximum number of forgone surgeries based on the surgery rate analysis minus minimum estimate based on analysis of patients referred to the CPES.
- minimum sentinel effect = minimum number of forgone surgeries based on the surgery rate analysis minus maximum estimate based on analysis of patients referred to the CPES.

These estimates, as outlined below in Table 37, were constructed for Bay State and Central Mass. using the figures displayed in Table 36.

Table 37

MINIMUM AND MAXIMUM ESTIMATE OF THE SENTINEL EFFECT IN BAY STATE AND CENTRAL MASS.

Procedures	Bay State HCF		Central Mass. HCF	
	Maximum	Minimum	Maximum	Minimum
T&A	350	231	55	0
Hem	18	3	9	0
Chol	0	0	0	0
Meni	8	0	0	0
SMR	0	0	26	7
VV	23	0	0	0
Hyst	72	2	12	6
Disc/SF	0	0	0	0
TOTALS	471	236	102	13

The only procedure showing a sizable sentinel effect under the minimum assumptions is T&A in Bay State. The maximum estimate also indicates a sentinel effect for hysterectomies, excision of varicose veins, hemorrhoidectomies and menisectomies in Bay State, and T&As, submucous resections and hysterectomies in Central Mass.

Only a very rough examination of whether there was a sentinel effect in the other three areas was possible. Since there is only one estimate for these areas from the surgery rate analysis, there is only one estimate of sentinel effect.

In Charles River, only hysterectomies indicate a measurable decline in surgery rates post-CPES (17 forgone hysterectomies annually). A minimum estimate of direct program impact would result in a sentinel effect of 10 surgeries (seven patients not confirmed for hysterectomies), a maximum estimate of direct program effect would result in no sentinel effect.

In Western and Southeastern Mass. HCFs, where the desk audit model is used, only those cases not meeting the criteria recieve a consultation. The sentinel effect was approximated by comparing the number of forgone surgeries predicted by the surgery rate analysis to the number of cases not meeting the preset criteria, as outlined below in Table 38. This would be a minimum estimate of the sentinel effect, since all patients not meeting criteria do not forgo surgery.

Table 38

ESTIMATE OF THE SENTINEL EFFECT IN WESTERN AND SOUTHEASTERN MASS HCFs.

	Western Mass. HCF			Southeastern Mass. HCF		
Procedures	Number of Forgone Procedures	Number not Meeting Criteria	Estimated Sentinel Effect	Number of Forgone Procedures	Number not Meeting Criteria	Estimated Sentinel Effect
T&A	0	73	0	168	2	166
Hem	0	12*	0	12	13*	0
Chol	0	0	0	45	3	42
Meni	0	4	0	14	5	9
SMR	29	5	24	0	1	0
VV	0	21		0	15*	0
Hyst	71	93	0	53	40	13
Disc/SF	0	2	0	0	5	0
TOTALS	100	210	24	292	84	230

* All referred cases have a consultation, since there are no established criteria for the desk audit.

In Western Mass., there was only a sentinel effect for submucous resection/rhinoplasty. In Southeastern Mass., the sentinel effect appears to account for most of the estimated 266 forgone T&As, cholecystectomies, and hysterectomies, as only 45 of the cases proposed for these procedures did not meet the criteria.

2. Project Staff's "Best Estimate" of CPES Impact. The range of forgone surgeries attributable to the program extends from 130 to 586 in Bay State and from 47 to 144 in Central Mass. Project staff feel confident that the actual number of forgone surgeries attributable to the program fall within the above ranges, although each estimate individually has some limitation:

- surgery rate analysis
  - may overestimate CPES effect on procedures where the decline in rates was observed because the total decline is assigned to CPES;
  - may underestimate CPES effect for procedures where the decline is under 10-20 percent because small changes in surgery rates would not be detected.

- program referral analysis - may underestimate CPES effect because it excludes possibility of sentinel effect.
- maximum estimate - may overestimate the direct CPES effect by assuming all approvals, denials and no-show cancellations forgoing surgery do so because of the program.
- minimum estimate - may underestimate direct CPES effect by assuming no CPES impact on forgone surgeries for no-show cancellations or approval cases.

Taking into account the strengths and weaknesses of each estimate, project staff have constructed a "best" estimate of program impact. This was done by selecting one of the four estimates for each procedure, using the following criteria);

- if the minimum estimate from the surgery rate analysis is higher than either estimate from the analysis of referrals (evidence of sentinel effect), the maximum estimate from the analysis of program participants is chosen (T&A and hysterectomies in both HCFs, hemorrhoidectomies in Bay State and submucous resection in Central Mass.);
- if the estimate from the surgery rate analysis falls within the range of estimates from the analysis of referrals, the estimate from the surgery rates is chosen (menisectomies in Bay State);
- if only the maximum estimate from the surgery rate analysis shows an effect, the estimate from the referral analysis that is closest to the maximum is chosen (submucus resection and varicose vein excisions in Bay State and hemorrhoidectomy in Central Mass.);
- if neither estimate from the surgery rate analysis shows an effect, the minimum estimate based on program referrals is chosen (cholecystectomy and disc/spinal fusion in both foundations).

The best estimates for each procedure in each foundation are presented in Table 39. The project's best estimate of forgone surgeries accounted for by CPES is 342 in Bay State and 92 in Central Mass.

T&As in Bay State is the one case where the best estimate is most likely to be underestimated, given that the surgery rate analysis assigns 231 more T&As to CPES impact than the maximum estimate based on program referrals (391 versus 160). It is likely that the actual number falls within that range, but choice of any one number would be purely arbitrary. The associated cost savings based on all estimates of CPES impact are included in the following chapter.

Table 39

"BEST" ESTIMATE OF NUMBER OF FORGONE SURGERIES ATTRIBUTED TO CPES IN BAY STATE AND CENTRAL MASSACHUSETTS HCFs BY PROCEDURE

Procedure	Bay State	Central Mass.	Combined Foundations
T&A	160	46	206
Hem	16	1	17
Chol	4	0	4
Meni	25	1	26
SMR	10	26	36
VV	4	1	5
Hyst	113	14	127
Disc/SF	10	3	13
TOTAL	342	92	434

CHAPTER VII. IS THE MASSACHUSETTS CONSULTATION PROGRAM FOR ELECTIVE SURGERY COST EFFECTIVE?

The cost effectiveness of the Massachusetts CPES will be examined by comparing the savings generated by forgone surgeries attributable to the program, net of substitution costs, to program expenditures. The program costs will be only those expenditures incurred by Medicaid and the savings will only represent savings that Medicaid could have been expected to incur in the program's absence.

The first section presents CPES expenditures by region. The second section contrasts statewide expenditures and savings by foundations, while the third section focuses on the range of costs and savings by procedure and foundation for Bay State and Central Mass. HCFs. The final section will summarize the available savings estimates and make recommendations for other areas interested in reducing surgery expenditures through implementation of an SOP.

A. Program Expenditures

Medicaid spent $293,799 on the CPES during the program's full first year of operation.* Of the total cost, 77 percent was for administration, 22.5 percent for physician services, and 0.5 percent for diagnostic tests billed by consultants (see Table 40).

The portion of total costs accounted for by administration was significantly higher in the Western and Southeastern Mass. HCFs, where the desk audit model is used (91 and 96 percent versus the 63 to 74 percent range in the areas using the hands-on model), which was expected, given that fewer patients referred to the desk audit regions receive physician consultations. However, as indicated in Table 41, the average administrative cost per referral for Western and Southeastern Mass. HCFs ($45 and $36 respectively) falls within

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* Expenditures for the first 12 months of CPES in each site are included.

Table 40

MEDICAID EXPENDITURES FOR THE CONSULTATION PROGRAM FOR ELECTIVE SURGERY FOR THE FIRST YEAR OF PROGRAM OPERATIONS IN EACH REGION

Areas	Expenditures on Administration	Expenditures on Consultant Services	Estimated Payments for Diagnostic Tests*	Total
DPW-Medical Div.	$21,772 (100.0%)	0	0	$21,772 (100.0%)
Western Mass. HCF	41,943 (90.7%)	$4,235 (9.2%)	$63 (0.1%)	46,241 (100.0%)
Central Mass. HCF	38,625 (74.3%)	12,946 (24.9%)	421 (0.8%)	51,992 (100.0%)
Charles River HCF	7,876 (64.7%)	4,247 (34.9%)	42 (0.4%)	12,165 (100.0%)
Bay State HCF	74,051 (62.7%)	43,122 (36.5%)	872 (0.7%)	118,045 (100.0%)
Southeastern HCF	42,000 (96.3%)	1,560 (3.6%)	24 (0.1%)	43,584 (100.0%)
TOTALS	$226,267 (77.0%)	$66,110 (22.5%)	$1,422 (0.5%)	$293,799 (100.0%)

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* Expenditures for diagnostic tests in Bay State and Central Mass. were calculated based on allowable payments for diagnostic tests ordered during study year, reduced by 50 percent to account for the fact that most consultants do not bill for tests done. For Western, Southeastern, and Charles River HCFs, Medicaid payments for diagnostic tests are estimated by assuming 10 percent of the consultations involved tests, an average of $6 per patient tested, and assuming only half are billed to Medicaid.

Table 41

MEAN ADMINISTRATIVE AND TOTAL COST PER REFERRAL BY FOUNDATION AND MEAN CONSULTATION COST (EXCLUDING DPW CENTRAL OFFICE COSTS)

Foundations	Number of Referrals	Number of Consultations	Administrative Cost Per Referral	Consultant Cost/No. Consults	Total Cost Per Referral
Western Mass. HCF	942	193	$44.53	$21.94	$49.09
Central Mass. HCF	547	515	75.00	25.14	95.05
Charles River HCF	257	222	30.65	19.13	47.33
Bay State HCF	1954	1649	37.90	26.15	60.41
Southeastern HCF	1164	74	36.09	21.08	37.44
TOTAL	4864	2653	$42.04	$24.92	$55.93

the range of average administrative cost per referral in the three areas using the hands-on model (from $31 to $75).

The average physician payment for a consultation ranges from a low of $19 in Charles River to a high of $26 in Bay State.

The average total cost per referral was expected to be higher in the areas using a hands-on model since a higher percentage of patients referred in these areas would receive a consultation and thereby incur an additional $20-$25 in physician fees. In fact, Southeastern Mass. has the lowest total cost per referral ($37), followed by Charles River ($47), which had both the lowest administrative cost per referral and the lowest average consultant cost. Central Mass. had by far the highest total cost per referral, accounted for by that foundation's high average administrative cost ($75).

B. Statewide Savings

The analysis of surgery rates provides an estimate of the number of forgone surgeries for each type of CPES procedure by foundation (see page 123). that are attributable to the program for the period 12 months after program implementation in each HCF region. Only the total program costs for the same time period in each area are available, per procedure costs are not. As described in Chapter III, savings associated with each forgone surgery were estimated using the average hospital charge in each region, and an average of the typical and pro-rated profiles of nonhospital charges developed from Bay State and Central Mass. program referrals that have CPES referrals. Since there were no identifiable alternative medical care costs, the only offset to savings for substitute care were costs for related surgery. These costs were estimated from the percentage of cost reduction for related surgery in Bay State and Central Mass. referrals. As the number of forgone surgeries from the surgery rate analysis includes sentinel effect cases as well as program referrals electing not to have CPES surgery, this offset to savings for related surgery may underestimate program savings (if sentinel effect cases are in fact less likely to have a related surgery than CPES participants).

The statewide savings by foundation by HCF area are presented in Table 42, which includes the gross savings, savings net of estimated substitution costs, program costs, savings net of program costs, and the ratio of costs to savings net of substitution costs. (Appendix 24 includes detailed calculations for this table.)

Statewide net savings for the CPES are estimated at $858,506 for the 12 months following program implementation in each region for a cost to savings ratio of 1 : 3.9. The program saved money in every HCF area, with Southeastern Mass. and Bay State having the highest cost/savings ratio at 1 : 5.3 and 1:5.0 respectively. Excluding estimated savings from the three HCFs where there was not a full 12 months of post-CPES data in the surgery rate analysis, the net program savings are over $430,000 (savings for Bay State and Central Mass. adjusted for related surgery total $726,673 minus statewide program costs of $293,799).

Table 42

ESTIMATE OF CPES SAVINGS TO MEDICAID BASED ON ANALYSIS
OF SURGERY RATES BY FOUNDATION

	Western	Central	Charles River	Bay State	Southeastern	Total
Gross Savings	$149,715	$126,072	$34,306	$659,090	$278,036	$1,247,219
Savings Net of Substitution Costs	138,910	117,358	31,390	609,315	255,332	1,152,305
Program Costs	50,595	56,346	16,519	122,401	47,938	293,799
Net Savings	88,315	61,012	14,871	486,914	207,394	858,506
Ratio of Costs to Savings Net of Substitution Costs	1 : 2.7	1 : 2.1	1 : 1.9	1 : 5.0	1 : 5.3	1 : 3.9

C. Savings for the Bay State and Central Mass. Regions

There are four different estimates of the savings in the Bay State and Central Mass. regions, each based on a different interpretation of the number of forgone surgeries attributable to the CPES:

a) a minimum and maximum estimate of forgone surgeries attributable to the program based on the surgery rate analysis;

c) a minimum and maximum estimate of forgone surgeries based on the analysis of the program participants.

Savings figures based on these four estimates of forgone surgeries are presented in Table 43, and described in detail in Appendix 25. Costs per procedure are based on the consultant costs for each procedure, plus an allocation of administrative costs based on the number of consultations and special considerations, plus a share of diagnostic test costs based on tests ordered by procedure. The savings figures have been adjusted to account for costs of related surgeries.

In Bay State, net savings based on the surgery rate analysis range from $432,697 to $486,864. Hysterectomies and T&As account for most of the savings in either estimate (97 percent of the minimum, 86 percent of the maximum). Cholecystectomies and disc/spinal fusions show a loss in either estimate.

The analysis of program referrals in Bay State results in a range of net savings from $102,165 to $602,501. All procedures break even in the maximum estimate, and all but T&As, hemorrhoidectomies, and cholecystectomies break even under the minimum estimate.

In Central Mass., the range of net savings between the estimates based on the surgery rate analysis was wide, from a minimum estimate of $10,548 to the maximum estimate of $61,012. The difference between the two estimates is that T&As and hemorrhoidectomies are counted as savings in the maximum estimate only. Hysterectomies account for most of the savings, followed by submucus resections/

Table 43

FIVE ESTIMATES OF PROGRAM SAVINGS FOR BAY STATE AND CENTRAL MASS. HCFs BY PROCEDURE

B A Y   S T A T E   H C F

	SAVINGS ESTIMATES BASED ON SURGERY RATE ANALYSIS				SAVINGS ESTIMATE BASED ON PROGRAM REFERRALS				BEST COMPOSITE SAVINGS ESTIMATE		
	MAXIMUM		MINIMUM		MAXIMUM		MINIMUM				
Procedure	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	Cost/Benefit Ratios
T&A	391	$184,154	391	$184,154	160	$47,151	41	$-21,657	160	$47,151	1 : 2.0
Hem	19	16,280	19	16,280	16	14,047	1	-786	16	14,047	1 : 6.8
Chol	0	-11,657	0	-11,657	27	56,899	4	-613	4	-613	1 : 0.9
Meni	25	30,503	25	30,503	45	61,363	17	22,605	25	30,503	1 : 5.1
SMR	9	1,567	0	-9,018	33	30,186	10	2,862	10	2,862	1 : 1.3
VV	27	38,834	0	-4,748	23	32,420	4	1,716	23	32,420	1 : 7.8
Hyst	115	233,977	115	233,977	113	229,020	43	60,402	113	229,020	1 : 7.6
SF/Disc	0	-6,794	0	-6,794	31	131,415	10	37,636	10	37,636	1 : 6.5
TOTAL	586	$486,864	550	432,697	448	$602,501	130	$102,165	361	$393,026	1 : 4.2

C E N T R A L   M A S S .   H C F

	SAVINGS ESTIMATES BASED ON SURGERY RATE ANALYSIS				SAVINGS ESTIMATE BASED ON PROGRAM REFERRALS				BEST COMPOSITE SAVINGS ESTIMATE		
	MAXIMUM		MINIMUM		MAXIMUM		MINIMUM				
Procedure	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	No. of Cases	Net Savings	Cost/Benefit Ratios
T&A	82	$12,791	0	$-30,734	46	$-8,506	27	$-16,316	46	$-8,506	1 : 0.7
Hem	9	5,907	0	-1,032	1	253	0	-1,032	1	253	1 : 0.2
Chol	0	-4,148	0	-4,148	5	5,412	0	-4,148	0	-4,148	1 : 0.0
Meni	0	-2,669	0	-2,669	6	3,307	1	-1,268	1	-1,268	1 : 0.5
SMR	33	22,307	33	22,307	26	15,786	7	991	26	15,786	1 : 3.5
VV	0	-1,533	0	-1,533	7	7,658	1	-220	1	-220	1 : 0.9
Hyst	20	31,656	20	31,656	14	20,749	8	9,258	14	20,749	1 : 4.3
SF/Disc	0	-3,299	0	-3,299	4	10,105	3	6,754	3	6,754	1 : 3.0
TOTAL	144	$61,012	53	$10,548	109	$54,764	47	$-5,981	92	$29,400	1 : 1.5

rhinoplasties. Cholecystectomies, menisectomies, varicose vein excisions, and disc surgeries/spinal fusions show a loss in either estimate. The minimum estimate based on program referrals for Central Mass. shows a loss of $5,981 while the maximum estimate indicates savings of $54,764. Only disc surgeries, SMRs, and hysterectomies show net savings in the minimum estimate, while all procedures but T&As break even in the maximum estimate.

There is considerable range in the estimates of savings for each foundation, from $102,165 to $602,501 in Bay State, and from $-5,981 to $61,012 in Central Mass. On a per capita basis, this translates into a range of net savings from $.43 to $2.51 per person in Bay State and from a loss of $.13 to a savings of $1.37 per person in Central Mass. Differences between the time series estimates and the program referral estimates have two explanations:

1. The time series analysis is unlikely to detect small but real changes in surgery rates. For very expensive procedures, such as disc surgery/spinal fusion, small changes may translate into large dollar impacts.
2. The program participant analysis will not detect a sentinel effect. Thus, it fails to accord a large magnitude of program impact to T&As, an inexpensive procedure that accounts for a large share of consultations, and therefore program costs.

The problem in making accurate estimates of the savings of second opinion programs is identifying which forgone surgeries are attributable to the program. As discussed in the previous chapter, the estimates of forgone surgeries based on various assumptions have been used to develop a "best" estimate, as illustrated in Table 39, above. While actual savings are in the reported ranges, the project's best estimate of savings for Bay State is $393,026, with a 1 : 4.2 ratio of costs, and $28,115 in Central Mass., with a cost to savings ratio of 1 : 1.5. Therefore, the best estimates predict a per capita net savings of $1.64 in Bay State and $.63 in Central Mass.

D. Discussion

The savings associated with the Massachusetts second opinion program have been found to exceed program costs from Medicaid's perspective. The magnitude of program savings estimated differs based on various assumptions regarding how many of the observed forgone surgeries are a result of the program. Depending on the reader's interpretation of the evidence regarding CPES impact, the program in Bay State and Central Mass. saved Medicaid between $96,184 minimum and $663,513 maximum, with a "best" estimate savings of $420,473. The only estimate of statewide savings is $858,506. The state and federal Medicaid programs shared any savings in equal proportion, as the program costs are shared approximately equally,* and the state and federal matching funds that would have been incurred without the program would have been shared on a 50-50 basis.

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* The only difference is that the federal government pays 75 percent of DPW's administrative costs.

CHAPTER VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Summary of Findings

In Chapter I, nine research questions to be addressed in the analysis were presented. These questions have been discussed in detail in previous chapters; the following is a brief outline of the findings.

Questions	Answers
1. Did the rates of surgery for the eight procedures covered by CPES decline following program implementation?	1. Seven of the eight procedures showed a statistically significant decline in rates in at least one of the five regions in the state. The only procedure with no decline was disc surgery/spinal fusion.
2. Did program impact differ by procedure?	2. Hysterectomy had the highest percentage reduction in rates (26 percent) followed by hemorrhoidectomy and menisectomy (both 23 percent), and then by T&As (22 percent). The remaining three procedures with declines had decreases ranging from 7 to 17 percent.
3. Was the program impact primarily the result of a sentinel effect or of a direct program effect on patients participating in the program?	3. In most areas, there was evidence of a sentinel effect contributing to the decline of T&As and hysterectomies. The program impact in Southeastern Mass. HCF is most likely the result of a sentinel effect, as very few patients had consultants in that area.
4. Were there differences in program impact by region?	4. All areas showed at least a 7 percent decline in the total number of CPES operations, while Bay State had a 25 percent reduction and Southeastern Mass. had a 24 percent reduction.
5. Were there differences in program impact between the regions using the desk audit and those using the hands-on model?	5. The percent decline in the surgery rates ranged from 7 percent (in Charles River) to 25 percent (in Bay State) in the hands-on area and from 8 percent (in Western Mass.) to 24 percent (Southeastern Mass.) in the desk audit areas. However, findings for Charles River, Western and Southeastern Mass. are to be considered preliminary, given that there was less than 12 post-CPES months of data for these foundations. The remaining two areas, using the hands-on model, show a combined decline of 24

Questions	Answers
	percent (25 percent in Bay State, 21 percent in Central Mass).
6. Was the likelihood of patients having surgery related to the outcome of the consultation?	6. Eighty-five percent of the patients in Bay State and Central Mass. who are confirmed have the originally proposed surgery, compared to 31 percent of the patients not confirmed by the first consultant.
7. Was the CPES cost-effective statewide?	7. The only statewide estimate indicates a cost/benefit ratio of 1 : 3.9 ($293,799 spent to $1,152,305 estimated savings).
8. Did the cost effectiveness vary by region?	8. Cost/benefit ratios range from 1 : 1.9 (at Charles River) to 1 : 5.3 (at (Southeastern Mass.).
9. Does the cost effectiveness vary by procedure?	9. Based on the "best" estimate of the number of forgone surgeries attributable to the program in Bay State and Central Mass., the cost/benefit ratios per procedure range in Bay State from 1 : 0.9 for cholecystectomies to 1 : 7.6 for hysterectomies, and in Central Mass. from 1 : 0.0 for hemorrhoidectomies and cholecystectomies to 1 : 4.3 for hysterectomies.

The analysis of the CPES has utilized both a macro and micro approach. The macro approach consisted of an analysis of surgery rates which measured the program's effect on the total eligible population. Only the macro analysis is able to account for any sentinel effect. The limitations of this analysis are that it does not detect small changes in the surgery rates and that the total amount of observed changes is attributed to CPES. The micro analysis studied patients referred to the program, merging information on program, patient, and surgery variables. The limitations of the micro analysis is that various assumptions must be made about which patients did not have surgery because of the program.

Project staff believe that combining a macro and micro analysis of a second opinion program provides more insight to that program's total impact on surgery than either approach taken singly. The design would be strengthened if the macro analysis were extended to consider surgical procedures not covered by the program. This would allow examination of whether any decreases in the amount of covered surgical procedures were offset by increases in uncovered procedures or populations. (For example, did D&Cs for Medicaid women increase while hysterectomies declined, or did hysterectomies for women with sources of payment other than Medicaid increase while the rate of Medicaid hysterectomies declined?)

Several limitations of the project's analysis should be recognized. First, the post-CPES surgery rates were tracked for less than two years in all areas of the state. While the generally observed pattern of surgery rates indicates no gradual trend after the initial drop in all areas (particularly in Bay State, where there are 22 months of post-program data), only the short term program impact on surgery can be addressed by the project's data.

Second, the project did not address any costs or benefits to patients, other than those incurred by Medicaid. Other costs or benefits to patients, providers or other insurers are possible, as suggested by the following exhibit (Exhibit XIV).

Third, the project did not address the important quality of care issues associated with having or forgoing any of the CPES procedures.

Fourth, the approach used to estimate possible costs for alternative medical treatments is admittedly rough, because there was no way to identify which claims were related to forgoing a CPES procedure.* If alternative medical treatment costs were small they would not be detected, but they would therefore not alter the net savings figures reported to any great extent. Costs of receiving alternative surgical treatment were taken as a direct offset to savings.

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* These were estimated by comparing unexplained claims for the surgery and no surgery groups for each procedure.

Exhibit XIV

POTENTIAL COSTS/BENEFITS TO PATIENTS, PROVIDERS AND OTHER INSURERS

	Costs	Benefits
Patients	- costs in pain* and time from not receiving surgical treatment - costs in time from receiving second opinion - confusion if opinions are conflicting.	- savings from time, pain and additional services associated with surgery and complications from surgery - value of information received during consultation.
Providers	- for proposing surgeons, time associated with completing program requirements - consulting physicians costs associated with missed appointments.	- increased awareness of differences in surgical criteria for surgery when consultants' recommendations are forwarded to the proposing surgeon.
Other Insurers	- costs associated with patients proposed for surgery, delaying surgery until a later point when they have other insurance.	- a similar reduction in surgery for covered procedures if surgeons have modified their criteria for doing surgery.

The Department of Public Welfare is in the process of revising the CPES. A request for proposal (RFP) for administering the program was issued in late December 1979. It requires the following:

- A single contractor for the whole state. It is expected that a single contractor will be able to take advantage of economies of scale and thereby reduce program costs (although the contractor will be able to subcontract to regional groups).
- A personal consultation in all areas. The hands-on consultation model has the advantage of increasing the patient's role in the surgery decision, by providing additional information on the need for surgery and the options for treatment.*

The procedures covered by the program are also being reevaluated, and other procedures may be added. The information generated through this analysis will be used in making these decisions.

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* For procedures where there is physician agreement on the most efficacious surgical treatment for an established diagnosis (such as cancer in situ for hysterectomies or symptomatic gall stones for cholecystectomies), and where, consequently, patient choices are less likely to be influenced by a second opinion, special considerations can be given with a retrospective review of operative/pathology reports to confirm the diagnosis.

DPW will also be enforcing program regulations by disallowing claims for CPES procedures if the patient has not completed the program (or been admitted as an emergency) when the new MMIS is completed.

Many of the quality of care issues related to the CPES and a longer term profile on the program's cost effectiveness will be examined by Abt Associates, of Cambridge, Massachusetts, under a contract with DHEW's Health Care Financing Administration. Massachusetts is one of several second opinion programs included in Abt's study, which will be completed in 1981.

B. Recommendations for Other Areas Interested in Establishing Second Surgical Opinion Programs

Readers interested in using information from this analysis of the CPES must be careful about generalizing the effect of second opinion programs based on this program. The CPES is focused on a Medicaid population, comprised primarily of children and adult women. Within Massachusetts, the program effect on surgery rates has varied by region, even though the age and sex characteristics of the population at risk are similar across areas.

There are, however, several general recommendations/comments that project staff would offer for consideration in the design, implementation, and evaluation of future SOPs.

1. An SOP's Role in Providing Patients with Information Should Be Examined. The study has demonstrated that the CPES savings exceed costs, but the magnitude of net savings depends on an interpretation of how much of the observed decline in surgery was attributable to the program. DPW and health care foundation staff interviewed expressed strong belief in the program's value in providing additional information to patients to improve their ability to assess the surgery option. While project staff did not attempt to "measure" the quantity, quality or

value of information provided, the review of consultant reports on over 2164 cases having consultations indicated that Medicaid patients were provided with additional information about their proposed surgery as a direct result of CPES. It is expected that the transference of such information is an objective that would be supported by both physician and patient groups, and if this object is achieved, it may substantially improve the benefits associated with an SOP.

2. The Costs/Savings Ratio Will Be Improved When Administrative Costs Are Kept Reasonable.

   The decentralized administration of the CPES and lack of guidelines for the original estimation of program costs resulted in high fixed administrative costs for areas where the volume of referrals received did not fully utilize the fixed resources assigned to the program. Certain economies of scale, in particular the cost of administrative medical personnel, could be realized through a single referral center or by only paying such personnel for the portion of time spent on the SOP. The administrative costs for paper reviews in the desk audit areas ($36 to $45 per case) should also be examined.

3. The Selection of Covered Procedures Should Take into Account a Balance Between Expected Volume, Nonconfirmation Rates, Sentinel Effect, and Degree of Discretion/Choice Exercised by the Patient.

   Some examples of the interaction between these factors in the Massachusetts experience are outlined below.

   - The procedure with consistently positive savings in Massachusetts was hysterectomy, an expensive procedure with high volume, evidence of a sentinel effect, and with a nonconfirmation rate of over 20 percent.

- The highest volume procedure, T&A, was the least expensive, and had a high confirmation rate; it only broke even where a sentinel effect was taken into account.
- Cholecystectomy, with a higher than average volume, was expensive, showed no sentinel effect, and had the highest overall confirmation rate; it only broke even under maximum assumptions of program impact.
- Spinal fusion/disc surgery was a low volume procedure that was very expensive and had a greater than 20 percent nonconfirmation rate. It had the best cost/benefit ratio in Bay State and Central Mass. based on program referrals.

4. The Choice Between a Hands-On and Desk Audit Consultation Model.

Both models in Massachusetts have generated savings, although the evidence for the desk audit model is preliminary. The hands-on consultation model has the advantage of providing information to patients, but it is also more expensive. For equity, a single model or program statewide may make more sense, but different procedures may be more appropriate for each model.

5. Program Evaluation Should Be Emphasized in Program Design and Implementation.

The following list suggests a number of considerations that SOP developers should take into account prior to program implementation. These activities will be necessary for an accurate assessment of program impact and will facilitate program management:

1. Development of a baseline profile of pre-program surgery rates.
2. Establishment of a system to monitor surgery rates after program implementation.
3. Design of an information system to collect and assemble data on program implementation (number and characteristics of referrals, program outcomes, etc.).
4. Creation of a system to track referrals to determine if/what/when surgery occurred.
5. Development of a plan for collecting information on costs of alternative medical/surgical care.

6. Allocation of program funds to support evaluation/monitoring efforts.

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APPENDIX 1

INDICATIONS FOR TONSILLECTOMY

Patient's Name: **Age:**

Patient's Mother's/Father's 1st Name:

Address:

Medicaid #: **Telephone #:**

Diagnosis:

Hospital:

Proposed Procedure:

Proposing Surgeon's Name:

Address: **Telephone #:**

INDICATIONS FOR TONSILLECTOMY

1. Peritonsillar abscess ☐
2. Pyrexial tonsillitis accompanied by convulsions or flare-up of streptococci-related entities ☐
3. Removal of unnecessarily large tonsils when necessary to facilitate an indicated adenoidectomy ☐
4. Five episodes of pharyngotonsillitis within the past (12) months for children seven years or under and four or more bouts of pharyngotonsillitis per year for at least (2) years for those children over seven years of age ☐

NOTE: The Foundation will selectively verify information contained in this form by obtaining copies of office or hospital records, retrospectively. You have the option, prior to surgery, to submit with this form, copies of relevant patient information supporting the "checked" portions. This will minimize your inconvenience of responding to our request for medical record information.

APPENDIX 2

DISPOSITION OF PROGRAM REFERRALS BY PROCEDURE
WESTERN MASS. HCF

(1 March 1978 - 28 February 1979)

Procedures	Total Referrals	Criteria Met	Criteria Not Met, Cancelled	Criteria Not Met, Confirmed on First Consultation	Criteria Not Met, Not Confirmed on First Consultation, No Second Consultation	Criteria Not Met, Not Confirmed On First Consultation, Confirmed on Second Consultation	Criteria Not Met, Not Confirmed on First Consultation, Not Confirmed on Second Consultation
T&A	477 (100%)	404 (84.7%)	10 (2.1%)	43 (9.0%)	9 (1.9%)	8 (1.7%)	3 (0.6%)
Hem	12 (100%)	no criteria	3 (25.0%)	7 (58.3%)	2 (16.7%)	0	0
Chol	90 (100%)	90 (100%)	0	0	0	0	0
Meni	24 (100%)	20 (83.3%)	1 (4.2%)	3 (12.5%)	0	0	0
SMR	81 (100%)	76 (93.8%)	0	5 (6.2%)	0	0	0
VV	31 (100%)	10 (32.2%)	0	16 (51.6%)	3 (9.7%)	2 (6.5%)	0
Hyst	203 (100%)	110 (54.2%)	3 (1.5%)	67 (33.0%)	11 (5.4%)	8 (3.9%)	4 (2.0%)
SF/Disc	24 (100%)	22(91.7%)	0	2 (8.3%)	0	0	0
TOTAL	942 (100%)	732 (77.7%)	17 (1.8%)	143 (15.2%)	25 (2.7%)	18 (1.9%)	7 (0.7%)

APPENDIX 3

DISPOSITION OF PROGRAM REFERRALS BY PROCEDURE
SOUTHEASTERN MASS. HCF

(1 May 1978 - 30 April 1979)

Procedures	Total Referrals	Criteria Met	Criteria Not Met, Cancelled	Criteria Not Met, Waived	Criteria Not Met, Confirmed on First Consultation	Criteria Not Met, Not Confirmed on First Consultation, No Second Consultation	Criteria Not Met, Not Confirmed on First Consultation, Confirmed on Second	Criteria Not Met, Not Confirmed on First Consultation, Not Confirmed on Second Consultation.
T&A	601 (100%)	599 (99.7%)	0	0	2 (0.3%)	0	0	0
Hem	13 (100%)	no criteria	2 (15.4%)	0	10 (76.9%)	0	1 (7.7%)	0
Chol	101 (100%)	98 (97.0%)	0	1 (1.0%)	1 (1.0%)	0	1 (1.0%)	0
Meni	35 (100%)	30 (85.7%)	0	1 (2.9%)	3 (8.5%)	0	0	1 (2.9%)
SMR	218 (100%)	217 (99.5%)	0	0	1 (0.5%)	0	0	0
VV	15 (100%)	no criteria	1 (6.7%)	2 (13.3%)	11 (73.3%)	1 (6.7%)	0	0
Hyst	164 (100%)	124 (75.6%)	0	2 (1.2%)	36 (22.0%)	1 (0.6%)	0	1 (0.6%)
Disc/SF	17 (100%)	12 (70.6%)	0	1 (5.9%)	4 (23.5%)	0	0	0
TOTAL	1164 (100%)	1080 (92.7%)	3 (0.3%)	7 (0.6%)	68 (5.8%)	2 (0.2%)	2 (0.2%)	2 (0.2)

APPENDIX 4

DISTRIBUTION OF PROGRAM REFFERALS BY PROCEDURE
CHARLES RIVER HCF

(1 May 1978 - 30 April 1979)

Procedures	Cancellations	Special Consideration Granted	Confirmed on First Consultation	Not Confirmed on First Consultation, No Second Consultation	Not Confirmed on First Consultation, Confirmed on Second Consultation	Not Confirmed on First Consultation, Not Confirmed on Second Consultation	Total Referrals
T&A	9 (5.9%)	0	128 (84.2%)	10 (6.6%)	4 (2.6%)	1 (0.7%)	152 (100.0%)
Hem	2 (40.0%)	1 (20.0%)	2 (40.0%)	0	0	0	5 (100.0%)
Chol	1 (4.0%)	8 (32.0%)	16 (64.0%)	0	0	0	25 (100.0%)
Meni	1 (16.7%)	2 (33.3%)	1 (16.7%)	2 (33.3%)	0	0	6 (100.0%)
SMR	2 (8.3%)	0	19 (79.2%)	0	3 (12.5%)	0	24 (100.0%)
VV	1 (10.0%)	1 (10.0%)	8 (80.0%)	0	0	0	10 (100.0%)
Hyst	0	7 (20.0%)	21 (60.0%)	2 (5.7%)	2 (5.7%)	3 (8.6%)	35 (100.0%)
SF/Disc	0	0	0	0	0	0	0
TOTAL	16 (6.2%)	19 (7.4%)	195 (75.9%)	14 (5.4%)	9 (3.5%)	4 (1.6%)	257 (100.0%)

APPENDIX 5

METHODS USED TO ESTIMATE AGE AND SEX CHARACTERISTICS OF CPES POPULATION

Using Monthly Summary of Expenditure Reports (MSERs) as source, for each category of assistance included in CPES population in each HCF, record number of individuals and number of cases, and calculate number of persons in each area:

1. a) for every AFDC-Basic and every MA-AFDC case, allow 1 adult female, assume remaining persons are under age 21;

   b) for every AFDC- Unemployed Father and every Refugee case, allow 1 adult male, 1 adult female, and assume remaining persons are under age 21;

   c) for every MA-Under 21 case, assume all persons are under age 21;

   d) assume under 21 population is 50 percent female and 50 percent male;

   e) calculate total number of adult males and females and total number of under 21 age males and females for each HCF.

2. Calculate age and sex profiles for January '76, '77, and '78, to insure that there were no significant shifts in the population.

APPENDIX 6

LIFE TABLES FOR TONSILLECTOMIES/ADENOIDECTOMIES AT CENTRAL MASS.

Days After Referral x	Alive and Under Observation at x 0x	Surgeries in (x' x+1) Sx	Withdrawals in x; x+1) Due to end of Study Wx	Effective Number Active at Risk of Surgery $0'x = 0x - \frac{Wx}{2}$	Probability of Surgery in (x' x+1) $Px = \frac{Sx}{0'x}$
≤ 7	276	0	0	276	0
8-15	276	5	0	276	1.8%
16-23	271	18	0	271	6.6%
24-30	253	37	0	253	14.6%
31-60	216	117	0	216	54.2%
61-90	99	33	0	99	33.3%
91-120	66	11	2	65	16.9%
121-180	53	5	8	49	10.5%
181-270	40	3	15	32.5	9.2%
270+	22	1	21	10.5	9.5%

APPENDIX 7

Sample Size Used To Calculate Length of Stay (LOS) and Non-Hospital Costs

Procedure	Total Number Referrals with CPES Surgery	Sample Size Used To Calculate LOS	Sample Size Used to Calculate Non-Hospital Costs
T & A	786	104 (13%)	104 (13%)
Hemorrhoidectomy	34	23 (68%)	23 (68%)
Cholecystectomy	211	67 (32%)	67 (32%)
Menisectomy	67	32 (48%)	32 (48%)
SMR/Rhinoplasty	128	83 (65%)	66 (52%)
Excision Varicose Veins	67	41 (61%)	30 (45%)
Hysterectomy	423	189*(45%)	50 (12%)
Disc Surgery/Spinal Fusion	84	55 (65%)	55 (65%)

* 25 Central, 165 Bay State

APPENDIX 8

RANGE AND MEAN MEDICAID PAYMENT OF CPES PROCEDURES BY FOUNDATION*

Procedure/ Range/Mean	Western MA.	Central MA.	Charles River	Bay State	Southeastern MA.
T&A					
range	$410-$451	$448-$619	$418-$485	$546-$638	$408-$453
mean	$431	$534	$452	$592	$431
Hem					
range	$1034-$1103	$1133-$1437	$1144-$1315	$1419-$1862	$1039-$1176
mean	$1068	$1285	$1224	$1641	$1108
Chol					
range	$1653-1925	$1802-2021	$1802-$2108	$2234-$3198	$1661-$1816
mean	$1789	$1912	$1955	$2716	$1739
Meni					
range	$1233-$1345	$1341-$1461	$1324-$1613	$1750-$2150	$1307-$1504
mean	$1289	$1401	$1469	$1950	$1406
SMR					
range	$841-$925	$784-$982	$819-$982	$1094-$1281	$783-$928
mean	$883	$883	$901	$1188	$856
VV					
range	$1083-$1122	$1180-$1445	$1180-$1845	$1461-$1771	$1086-$1863
mean	$1102	$1313	$1513	$1616	$1257
Hyst					
range	$1667-$1829	$1963-$2195	$1859-$2177	$2279-$2822	$1699-$1863
mean	$1748	$2079	$2018	$2551	$1781
Disc/SF					
range	$2827-$3295	$3058-$3643	Not Available	$3865-$5073	$2842-$5386
mean	$3061	$3351		$4443	$4114

* Range based on length of stay figures times average hospital per diem by HCF, combined with pro-rated and typical profile of nonhospital payments as described in Chapter III.

APPENDIX 9

DESCRIPTION OF TREATMENT OF RELATED SURGERIES CONSIDERED TO BE DIAGNOSTIC PROCEDURES

Dilation and Curettage (D&C)

Examined HCF* forms on patients having a consultation to determine which were recommended for diagnostic D&Cs, and which for therapeutic D&Cs by consultant.

Therapeutic D&Cs: 4 in Bay State, 2 in Central - all of the costs of these surgeries were netted out of gross savings.

Diagnostic D&Cs: 10 in Bay State, 3 in Central - 70 percent of the total costs were netted out of gross savings based on the finding that 30 percent of the patients having hysterectomies had one D&C before the referral and it was assumed that 30 percent of these D&Cs were done after the referral date would have been done regardless of the CPES program.

The average cost for D&Cs was estimated based on a review of Medicaid claims of patients having D&Cs ($600 in Bay State; $492 in Central Mass.).

Myleograms

All patients referred for disc surgery were allowed 1 myleogram. Therefore the cost for myleograms was not included in the calculation of savings of a forgone disc surgery.

For the 16 patients who do not have disc surgery or a myleogram, the savings of the forgone myleogram ($59.50) are added to gross savings as myleograms were always done on patients having disc surgery.

Myringotomies

Patients who forgo a T&A but have a myringotomy were assigned savings based only on the marginal payment for a T&A in that situation.

Five patients in each foundation had a myringotomy, but not the proposed T&A, and each were assigned marginal cost savings ($264 at Bay State and $206 at Central Mass.) based on the forgone T&As.

APPENDIX 10

Sample Size used to calculate substitution costs by procedure, based on Patients referred to the Bay State and Central Mass. HCF's

Procedure	Number of Referrals with CPES Surgery	Sample Size Used	Number of Referrals Not Having Any Surgery	Sample Size # Used
T & A	786	38 (4.8%)	221	39 (17.6%)
Hemorrhoidectomy	34	12 (35.3%)	15	12 (8.0%)
Cholecystectomy	211	31 (14.7%)	36	31 (81.6%)
Menisectomy	67	27 (40.3%)	34	30 (88.2%)
SMR	128	34 (26.4%)	64	42 (62.7%)
Excision of Varicose Veins	67	25 (37.3%)	36	23 (63.9%)
Hysterectomy	423	42 (9.9%)	118	42 (35.6%)
Disc/Fusion	84	17 (20.2%)	31	16 (51.6%)

Appendix 11

Mean expenditures for Samples of Patients referred to the Bay State and Central Mass. HCFs having CPES surgery and Patients not having any surgery, used to estimate costs of alternative medical treatment.

Procedure	Arithmetic mean of payments for referred patients having CPES surgery	Geometric* mean of payments for patients having CPES surgery	Arithmetic mean of payments for referred patients having no surgery	Geometric* mean of payments for referred patients having no surgery
T & A	96.03	-	54.64	-
Hemorrhoidectomy	239.54	-	164.01	-
Cholecystectomy	127.28	83.17	499.48	60.25
Menisectomy	202.55	-	153.02	-
Submucous Resection	289.61	-	124.72	-
Varicose Veins	133.68	43.65	211.81	82.12
Hysterectomy	233.43	112.20	310.94	117.48
Disc Surgery	599.40	-	598.54	-

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* only calculated for procedures in which the arithmetic mean was higher for the no surgery group; the p valves of the tests of the geometric means were .05 for hysterectomy and cholecystectomy, and .2 for varicose veins.

APPENDIX 12

SEX DISTRIBUTION OF REFERRALS BY PROCEDURE AND FOUNDATION

Tonsillectomy/Adenoidectomy

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	41.4	(302)	42.4	(120)	41.7	(422)
F	58.6	(427)	57.6	(163)	58.3	(590)
T	100.0	(729)	100.0	(283)	100.0	(1012)

Hemorrhoidectomy

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	26.7	(12)	0.0	(0)	22.2	(12)
F	73.3	(33)	100.0	(9)	77.8	(42)
T	100.0	(45)	100.0	(9)	100.0	(54)

Cholecystectomy

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	3.0	(6)	9.4	(5)	4.3	(11)
F	97.0	(196)	90.6	(48)	95.7	(244)
T	100.0	(202)	100.0	(53)	100.0	(255)

Menisectomy

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	45.4	(49)	25.0	(6)	41.7	(55)
F	54.6	(59)	75.0	(18)	58.3	(77)
T	100.0	(108)	100.0	(24)	100.0	(132)

Submucous Resection

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	46.8	(65)	35.4	(23)	43.1	(88)
F	53.2	(74)	64.6	(42)	56.9	(116)
T	100.0	(139)	100.0	(65)	100.0	(204)

Varicose Vein Surgeries

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	17.2	(15)	11.8	(2)	16.3	(17)
F	82.8	(72)	88.2	(15)	83.7	(87)
T	100.0	(87)	100.0	(17)	100.0	(104)

Disc/Spinal Fusion Surgeries

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	29.5	(31)	23.3	(7)	28.1	(38)
F	70.5	(74)	76.7	(23)	71.9	(97)
T	100.0	(105)	100.0	(30)	100.0	(135)

TOTALS (less Hysterectomies)

	Bay State		Central		Combined	
	%	No.	%	No.	%	No.
M	33.9	(480)	33.9	(163)	33.9	(643)
F	66.1	(935)	66.1	(318)	66.1	(1253)
T	100.0	(1415)	100.0	(481)	100.0	(1896)

APPENDIX 13

MEAN AGE OF REFERRALS BY PROPOSED SURGERY AND FOUNDATION

	Foundation		
Procedure	Bay State	Central MA	Combined
Tonsillectomy/ Adenoidectomy	9.4	9.3	9.4
Hemorrhoidectomy	37.2	28.9	35.8
Cholecystectomy	37.1	34.6	36.6
Menisectomy	28.5	30.2	28.9
Submucous Resection	26.6	27.0	26.8
Varicose Vein	38.1	35.6	37.7
Hysterectomy	37.8	38.0	37.8
Disc/Spinal Fusion	37.6	35.7	37.1
TOTALS	25.8 (1954)	20.8 (547)	24.7 (2601)

APPENDIX 14

CATEGORIES OF ASSISTANCE BY FOUNDATION

Category of Assistance	Foundation		
	Bay State	Central MA	Combined
Refugee (00)	0.3% (6)	0.2% (1)	0.3% (7)
SSI-Aged (01)	0.9% (17)	0.5% (3)	0.8% (20)
AFDC (02)	77.6% (1416)	77.5% (424)	77.6% (1940)
SSI-D (03)	6.9% (134)	4.9% (27)	6.4% (161)
General Relief (04)	2.5% (49)	1.5% (8)	2.3% (57)
MA-OAA (05)	0.2% (4)	0.2% (1)	0.2% (5)
MA-AFDC (06)	6.0% (118)	6.9% (38)	6.2% (156)
MA-DA (07)	0.9% (18)	0.5% (3)	0.8% (21)
MA Under 21 (08)	4.7% (92)	7.7% (42)	5.4% (134)
TOTALS	100.0% (1954)	99.9% (547)	100.0% (2501)

APPENDIX 15

REASON FOR DENIAL ON FIRST CONSULTATION BY PROCEDURE AND FOUNDATION

Procedures

Foundation/	T&A		Hem		Chol		Meni		SMR		VV		Hyst		SF		Totals	
Reasons	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	&	No.	%	No.
BAY STATE																		
medically unnecessary	74.5	41	33.3	1	44.4	4	40.0	10	36.8	7	42.9	3	29.4	25	40.0	6	44.7	97
all other	25.5	14	66.7	2	55.6	5	60.0	15	63.2	11	57.1	4	70.6	60	60.0	9	55.3	120
CENTRAL MASS																		
medically unnecessary	29.3	12	0.0	0	0.0	0	0.0	0	25.0	3	0.0	0	28.6	4	0.0	0	24.7	19
all other	70.7	29	100.0	1	0.0	0	100.0	1	75.0	9	100.0	1	71.4	10	100.0	7	75.3	58
COMBINED																		
medically unnecessary	55.0	53	25.0	1	44.4	4	38.5	10	33.3	10	37.5	3	29.3	29	27.3	6	39.5	116
all other	45.0	43	75.0	3	55.6	5	61.5	16	66.7	20	62.5	5	70.7	70	72.7	16	60.5	178

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APPENDIX 16

NUMBER AND PERCENT OF FIRST CONSULTATION CASES WITH DOCUMENTATION

Procedure	Bay State total # cases: 1561	Central Mass. total # cases: 473	Combined total # cases: 2034
T&A	55.4% (355)	61.7% (166)	57.3% (521)
Hem	42.9% (15)	62.5% (5)	46.5% (20)
Chol	75.0% (123)	81.6% (31)	76.2% (154)
Meni	70.1% (61)	63.6% (14)	68.8% (75)
SMR	51.3% (60)	63.6% (35)	55.2% (95)
VV	46.7% (35)	78.6% (11)	51.7% (46)
Hyst	66.1% (251)	64.4% (29)	65.9% (280)
Disc	74.2% (46)	81.8% (18)	76.2% (64)
Totals	60.6% (946)	65.3% (309)	61.7% (1254)

APPENDIX 17

Surgery - HCF Combinations in which Monthly Surgery Rates are Autocorrelated

Surgery - HCF Combination	Model*
T&As, Central Mass.	autoregressive, order 1
T&As, Charles River	moving average, order 1
T&As, Bay State	autoregressive, order 1
T&As, Southeastern Mass.	autoregressive, order 1
Varicose Veins, Western	autoregressive, order 1
Varicose Veins, Central Mass.	moving average, order 1
Varicose Veins, Charles River	no model fit because of non-normality
Disc/Spinal Fusion, Southeastern Mass.	moving average, order 1

* see Box and Jenkins, 1970

Appendix 18

LEVEL OF MONTHLY SURGERY RATES (PER 100,000) PRE-FEE CUT AND POST-FEE CUT TO CPES

		HCF					
PROCEDURE		Western	Central	Charles River	BayState	Southeastern	Control
T & A	PRE I*	109.13	92.48	82.36	43.93	94.24	106.58
	POST-I	96.69	73.03	74.09	34.99	87.34	89.73
HEM	PRE-I	4.66	3.18	2.94	2.63	3.43	3.92
	POST-I	4.45	4.70	4.30	2.84	3.37	3.99
CHOL	PRE-I	17.64	17.64	14.01	9.15	17.90	17.40
	POST-I	12.30	14.89	9.15	9.07	15.27	13.29
MENI	PRE-I	1.83	5.88	3.68	3.60	3.74	2.90
	POST-I	2.24	3.60	2.38	3.13	3.93	2.68
SMR	PRE-I	4.98	12.49	22.02	3.87	15.28	11.46
	POST-I	8.38	14.23	12.68	3.29	16.60	10.63
VV	PRE-I	5.85	4.01	4.40	3.44	6.70	6.66
	POST-I	4.25	4.29	5.03	3.51	3.38	3.96
HYST	PRE-I	28.61	15.19	21.36	17.56	28.68	27.92
	POST-I	28.61	15.51	19.17	16.79	24.34	25.87
DISC / Fusion	PRE-I	2.99	6.85	5.17	4.44	2.60	2.97
	POST-I	5.50	6.78	5.27	4.29	4.75	4.97

I = Intervention; the fee cut

Appendix 19

Two-Tailed P Value for the Test to Evaluate the Null Hypothesis that the Fee Cut Did Not Affect the Level of Surgery Rates

HCF

Procedure	Western	Central	Charles River	Bay State	Southeastern	Control
T & A	0.17	0.00	0.58	0.02	0.60	0.01
HEMORRHOIDECTOMY	0.88	0.08	.52*	0.72	0.94	0.92
CHOLECYSTECTOMY	0.01	0.21	0.12	0.95	0.42	0.03
SUBMUCOUS RESECTION	0.07	0.48	0.04	0.33	0.63	0.60
MENISECTOMY	0.61	0.08	.82*	0.34	0.83	0.72
VARICOSE VEINS	0.16	0.93	**	0.63	0.01	0.00
HYSTERECTOMY	1.00	0.89	0.60	0.62	0.08	0.33
DISC/FUSION	0.00	0.97	.93*	0.80	0.00	0.00

* P value for the Mann-Whitney U test.

** No analysis because of lack of independence and non-normality

APPENDIX 20

SURGERY/HCF COMBINATIONS IN WHICH THE FEE CUT AFFECTED MONTHLY SURGERY RATES

Surgery/HCF	Last Month Before Impact of Fee Cut Fully Realized (Month 1 = May 1975)
T&A	
Central Mass.	14th Month
Bay State	16th Month
Control*	9th Month
Hyst.	
Southeastern Mass.	14th Month
VV	
Southeastern Mass.	10th Month
Control*	9th Month
Meni.	
Central Mass.	12th Month
Hem.	
Central Mass.	11th Month
Chol.	
Western Mass.	14th Month
Control*	9th Month
SMR	
Western Mass.	13th Month
Charles River	11th Month
SF/Disc	
Western Mass.	11th Month
Southeastern Mass.	10th Month
Control*	9th Month
- Cases with Visual Indication of an Effect	
T&A	
Southeastern Mass.	16th Month
Chol.	
Charles River	10th Month
SMR	
Bay State	14th Month

---

* The Western Mass., Charles River and Southeastern Mass. HCFs combined.

Appendix 21

Effect of CPES on Monthly Surgery Rates

Tonsillectomy/Adenoidectomy

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop	-50.94	-66.23, -35.64	.00
Central	drop	-29.01	-48.64, -9.38	.00
	drop*	-15.14	-24.71, -5.57	.00
Control-Central	drop	-23.76	-38.98, -8.53	.00
	drop*	-16.18	-32.86, 0.51	.03
Charles River	drop	-20.14	-49.03, 8.74	.08
Bay State	drop	-20.74	-27.00, -14.49	.00
	trend-drop	-13.60	-22.87, -4.33	.00
	drop*	-12.52	-16.75, -8.29	.00
Control-Bay State	drop	-14.26	-26.12, -2.40	.01
	drop*	-1.94	-19.52, 15.63	.42
Southeastern	drop	-35.74	-58.89, -12.58	.00
	trend-drop	-20.35	-42.28, 1.58	.03
	drop*	-31.59	-45.65, -17.54	.00

Hemorrhoidectomy

Western	drop	-1.19	-3.55, 1.16	.16
Central	drop	-0.83	-2.28, 0.62	.13
	drop*	-1.70	-3.25, -0.15	.02
Control-Central	drop	-1.12	-2.78, 0.53	.09
Charles River	drop	-1.82	-	.32**
Bay State	drop	-0.65	-1.32, 0.02	.03
Control-Bay State	drop	-0.39	-1.65, 0.85	.27
Southeastern	drop	-1.48	-3.26, 0.31	.05

* indicates pre-fee cut data eliminated.
** value of Mann Whitney U test.

Cholecystectomy

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop	-1.58	-5.64, 2.46	.22
	drop*	-0.02	-3.98, 3.94	.50
Central	drop	-2.59	-6.22, 1.04	.09
Control-Central	drop	0.62	-4.30, 5.55	.60
	drop*	2.02	-1.28, 5.34	.88
Charles River	drop	6.54	-0.86, 13.94	.93
	drop*	7.89	0.59, 15.19	.98
Bay State	drop	0.06	-1.61, 1.74	.56
Control-Bay State	drop	-2.28	-5.85, 1.28	.10
	drop*	-0.75	-3.46, 1.96	.29
Southeastern	drop	-5.48	-11.86, 0.90	.04

Menisectomy

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop	-0.18	-1.61, 1.26	.40
Central	drop	-0.44	-2.40, 1.51	.32
	drop*	1.04	-0.77, 2.85	.13
Control-Central	drop	-0.53	-2.07, 1.01	.25
Charles River	drop	2.52	-	.19**
Bay State	drop	-0.86	-1.42, -0.31	.00
Control-Bay State	drop	0.67	-0.46, 1.79	.62
Southeastern	drop	-1.75	-3.67, 0.17	.04

* indicates pre-fee cut data eliminated.
** value of Mann Whitney U test.

Submucous Resection/Rhinoplasty

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop drop*	-1.74 -3.60	-4.90, 1.41 -6.65, -0.54	.14 .01
Central	drop	-6.24	-9.80, -2.68	.00
Control-Central	drop	1.80	-2.07, 5.68	.82
Charles River	drop drop*	-4.36 -2.05	-14.14, 5.42 -10.29, 6.20	.16 .31
Bay State	drop drop*	-1.19 -0.31	-1.88, -0.50 -1.09, 0.46	.00 .22
Control-Bay State	drop	2.83	0.09, 5.56	.98
Southeastern	drop	-0.85	-6.42, 4.73	.38

Excision Varicose Veins

Western	drop	-1.42	-4.35, 1.51	.17
Central	drop	-0.84	-2.00, 0.31	.08
Control-Central	drop drop*	-2.13 -1.55	-4.16, -0.10 -3.22, 0.12	.02 .03
Charles River	NOT CALCULATED LACK OF NORMALITY AND INDEPENDENCE			
Bay State	drop	-0.93	-1.79, -0.70	.02
Control-Bay State	drop drop*	-1.32 -0.53	-2.85, 0.21 -1.95, 0.89	.05 .23
Southeastern	drop drop*	-2.49 -1.60	-4.93, -0.05 -3.64, 0.44	.02 .06

* indicates pre-fee cut data eliminated.

Hysterectomy

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop	-8.94	-15.32, -2.56	.00
Central	drop	-3.68	-7.23, -0.13	.02
Control-Central	drop	-2.73	-7.92, 2.46	.15
Charles River	drop	-10.21	-18.75, -1.66	.01
Bay State	drop	-4.00	-5.88, -2.13	.00
Control-Bay State	drop	-1.61	-5.48, 2.26	.20
Southeastern	drop	-8.87	-14.02, -3.74	.00
	drop*	-6.47	-11.33, -1.60	.00

Disc Surgery/Spinal Fusion

HCF	Model	Change in Level	95% Confidence Interval	P-value
Western	drop	0.45	-1.46, 2.36	.32
	drop*	-0.09	-1.13, 0.95	.43
Central	drop	-1.16	-3.75, 1.43	.19
Control-Central	drop	0.00	-1.79, 1.79	.50
	drop*	-0.66	-2.31, 1.00	.22
Charles River	drop	0.01	-	.48**
Bay State	drop	-0.21	-1.14, 0.72	.33
Control-Bay State	drop	0.61	-0.69, 1.92	.82
	drop*	-0.25	-1.59, 1.09	.36
Southeastern	drop	-0.14	-1.80, 1.53	.44
	drop*	-0.55	-1.81, 0.70	.20

* indicates pre-fee cut data eliminated.
** value of Mann Whitney U test.

Appendix 22

Comments on Time Series: Basis for Placement in a Group

T&A - Western: Surgery rates appear level until month 27 and then start to decline. Negotiations were ongoing with physicians in Western for approximately 10 months prior to program implementation (month 34). The decline may have been due to these negotiations or to the implementation of CPES in Central Mass. or Bay State. There are suggestions of a further drop after program implementation. Nevertheless, in this case the decline that started in month 34 is not attributed to CPES. Hence, this is not placed in any group.

T&A - Central: If the fee cut is assumed to have a delayed effect that is not manifest until month 15, the first 14 months should be eliminated before analyzing program impact. There is then no evidence of a declining trend either pre-CPES (month 15 to month 29) or post-CPES (month 30 to month 44). If the trend model is accepted, a 17% drop per year is implied. Regional surgery rate data suggest that in the northeast, TA's have been declining at about 5% per year. Since the rate of decline suggested by the trend model seems unlikely and since there is no evidence of a trend after the first 14 months of data are eliminated, it appears likely there was program impact. Thus, this is placed in category 2.

T&A - Bay State: If the fee cut is assumed to have a delayed effect (i.e., the decline from month 12 to month 17) and therefore, the first 17 months of data are eliminated, there is a suggestion of program impact (though with only 5 months of pre-CPES data, it is difficult to feel confident about this). A declining trend model with no program impact implies a rate of decline of 21% per year. However, this was one of the two cases in which a declining trend model with a program impact (i.e., a trend-drop model) was acceptable. A 9.5% rate of decline is implied. A trend-drop model is not contra-indicated by the fact that the pre-CPES data shows evidence of a trend. Further, if pre-fee cut data is included, the significant drop in the control is an artifact resulting from the declining trend. If pre-fee cut data is excluded, there is no significant drop in the control. For these reasons, T&A-Bay State is placed in category 1.

T&A - Southeastern: This is the second case in which the trend-drop model fits the data. Again, this is the model used.

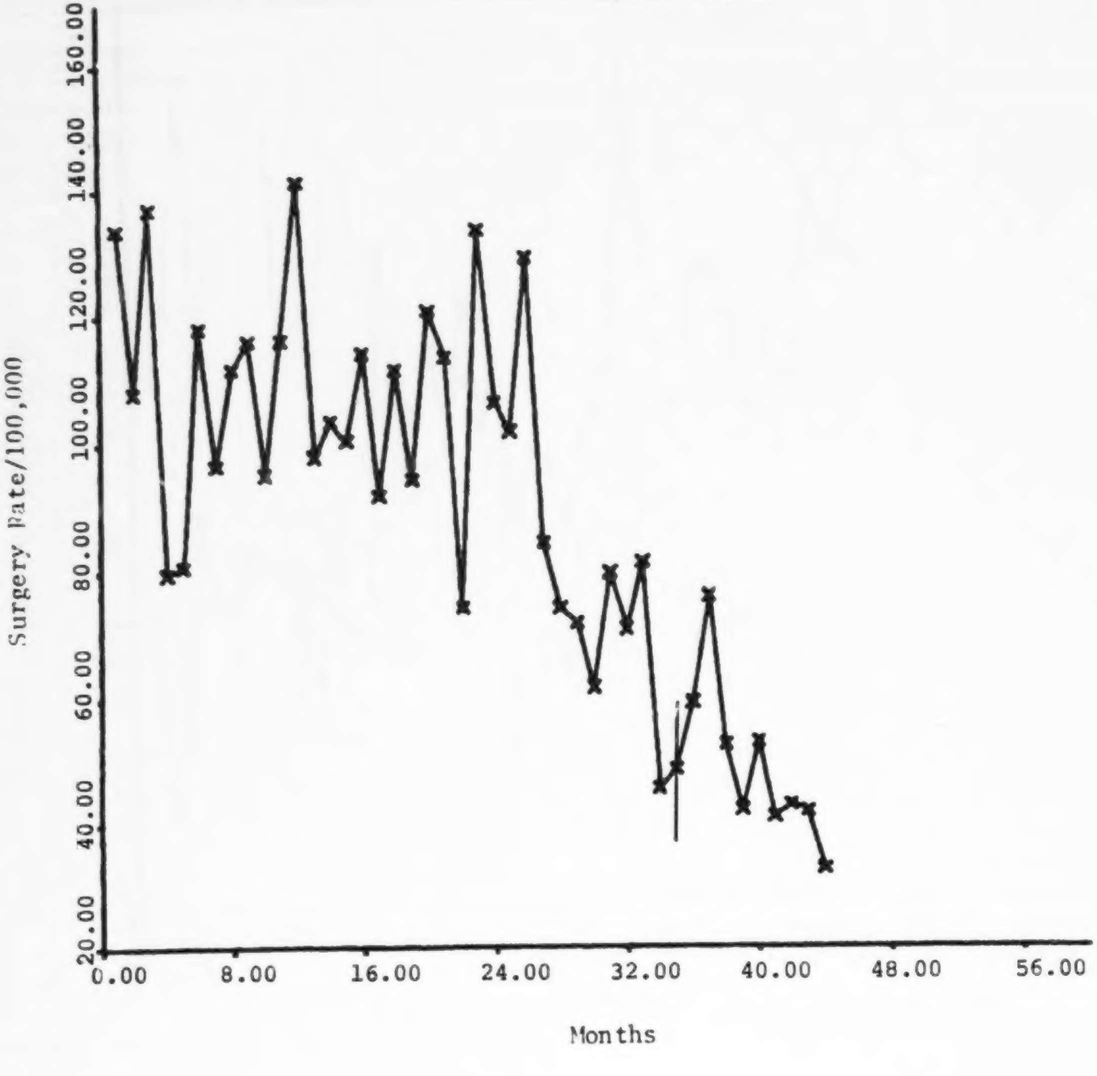
Hysterectomy - Southeastern: In the year prior to CPES, surgery rates were level. There is evidence of a lower level post-CPES. However, a trend model seems at least an equally adequate explanation of the data, though the rate of decline, 12%, implied by the trend model, seems high. Nevertheless, this is placed in category 2.

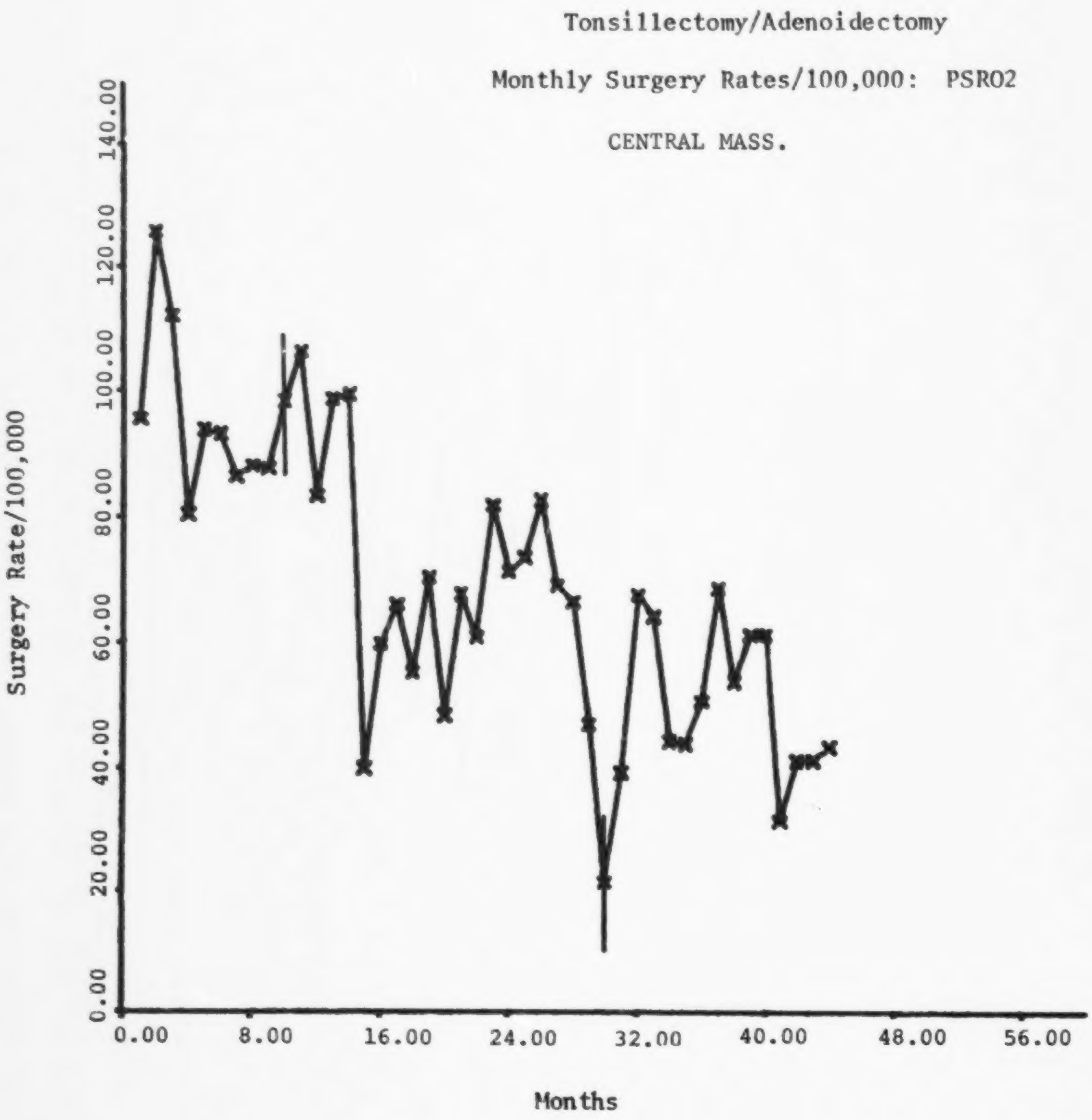
Nose surgery - Bay State: When the pre-fee cut data is eliminated, there is no indication of program impact. However, because surgery rates increased significantly in the control, this is placed in category 2.

Tonsillectomy/Adenoidectomy

Monthly Surgery Rates/100,000: PSRO1

WESTERN MASS.

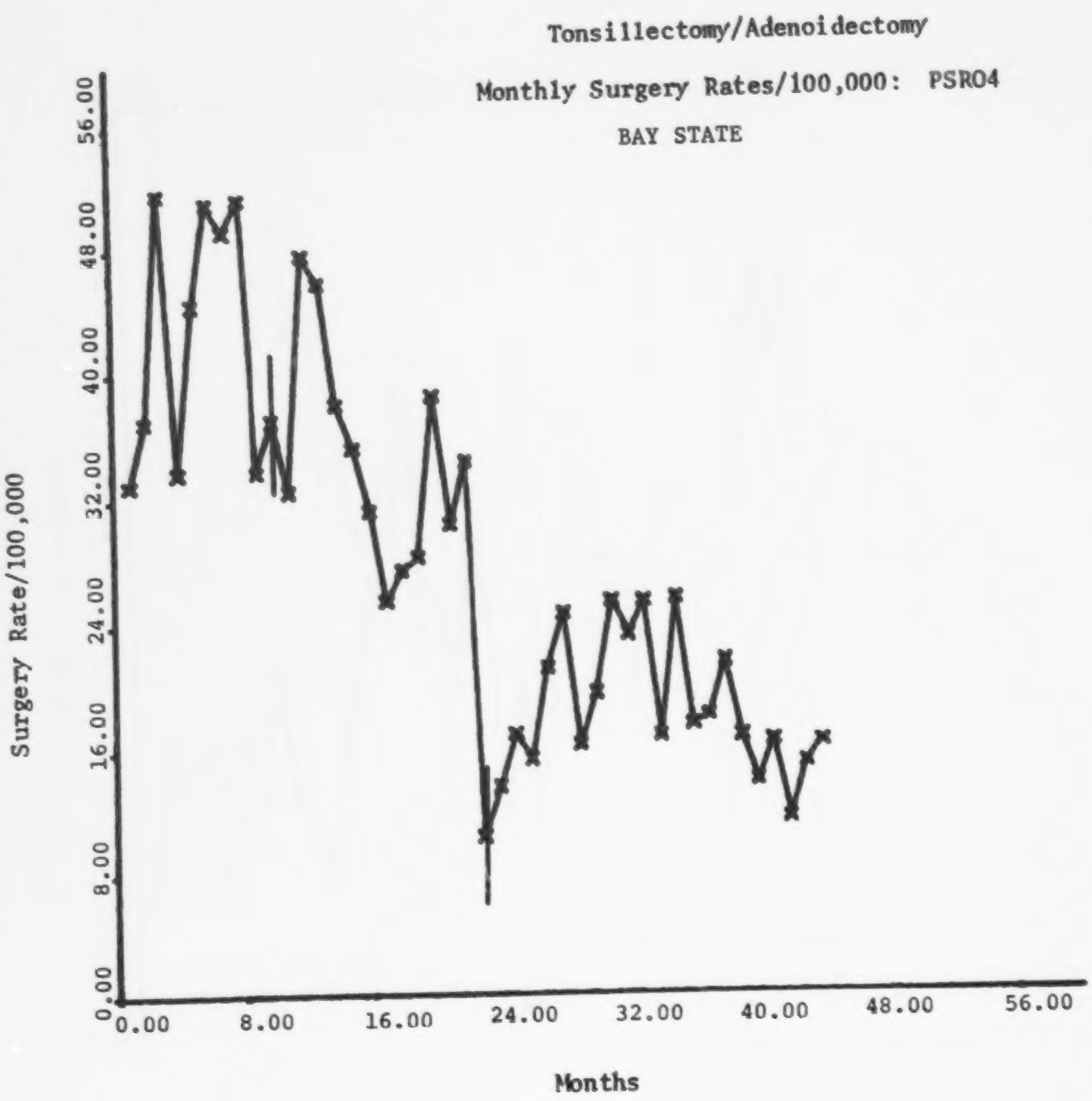




Tonsillectomy/Adenoidectomy

Monthly Surgery Rates/100,000: PSRO2

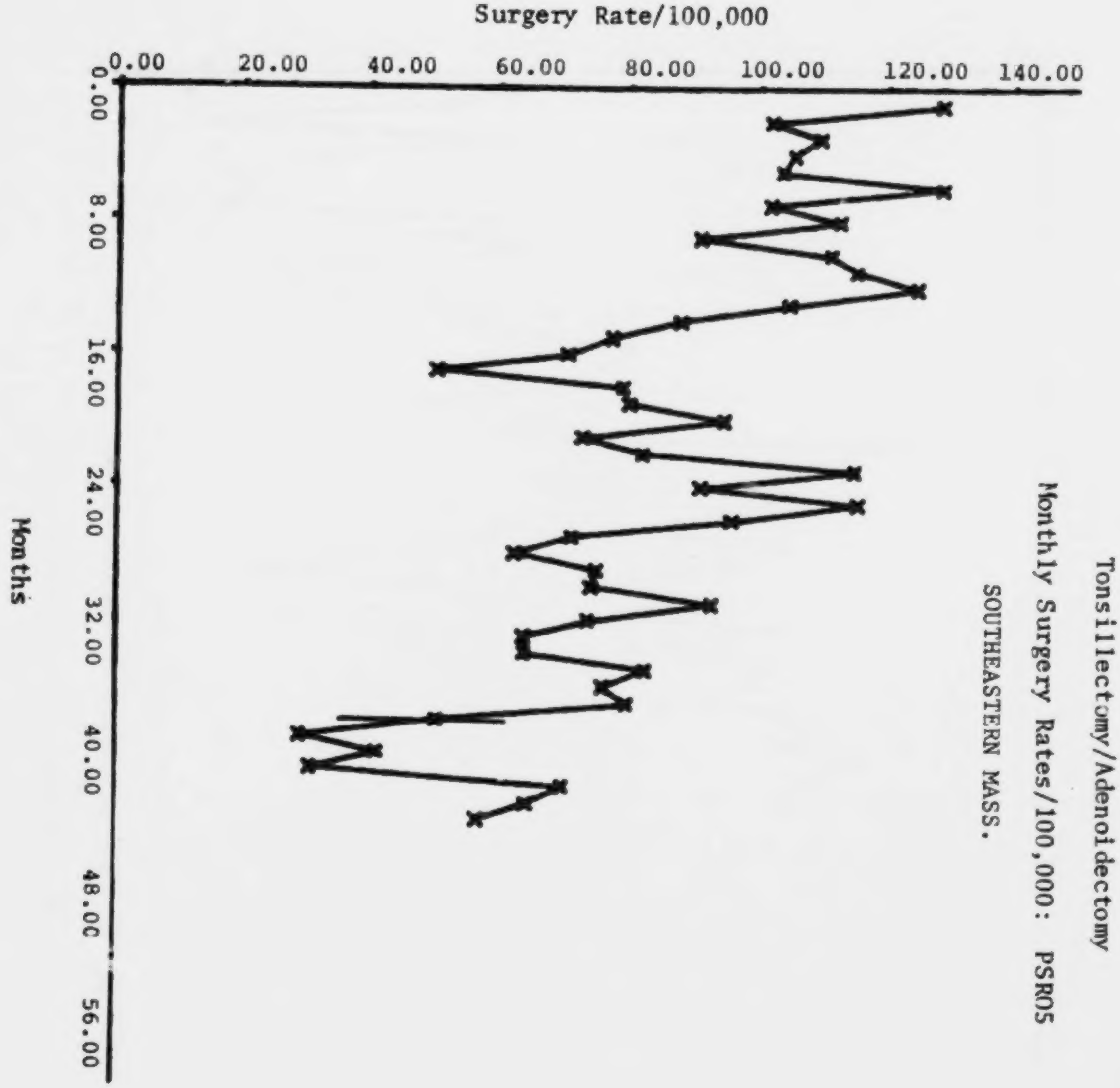
CENTRAL MASS.



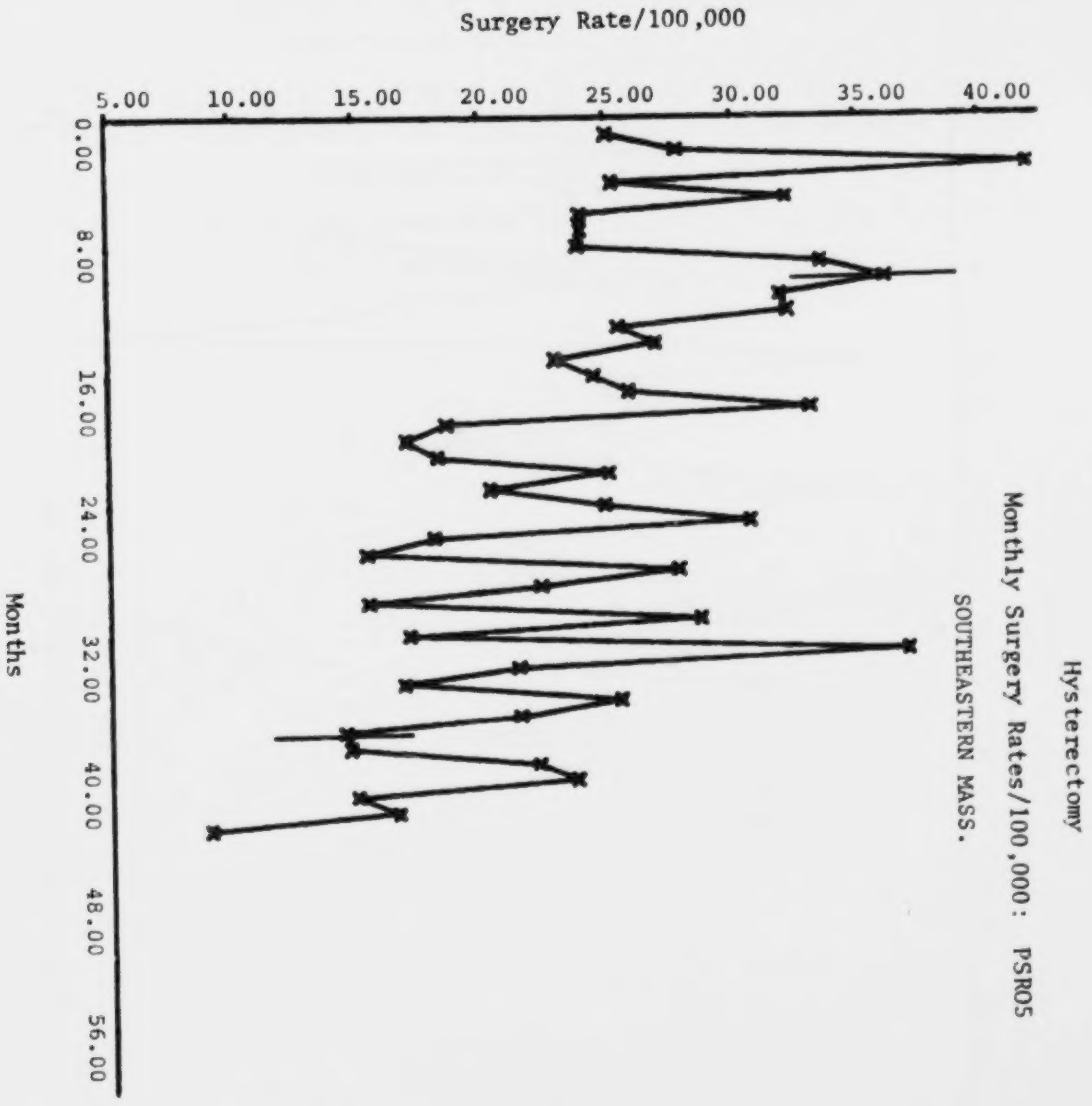
Tonsillectomy/Adenoidectomy

Monthly Surgery Rates/100,000: PSRO4

BAY STATE



Tonsillectomy/Adenoidectomy
Monthly Surgery Rates/100,000: PSRO5
SOUTHEASTERN MASS.

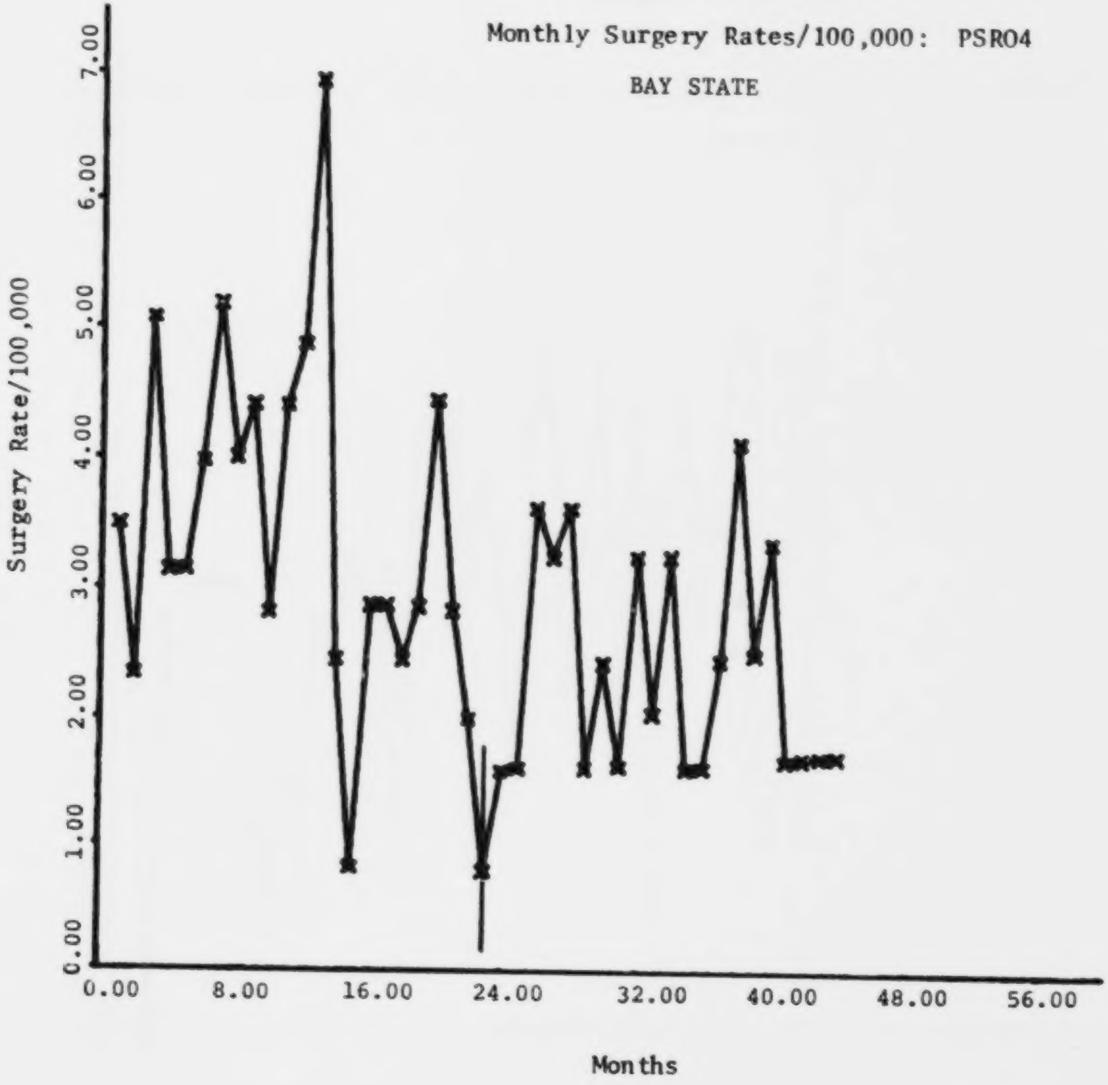


Hysterectomy
Monthly Surgery Rates/100,000: PSRO5
SOUTHEASTERN MASS.

Submucus Resection

Monthly Surgery Rates/100,000: PSRO4

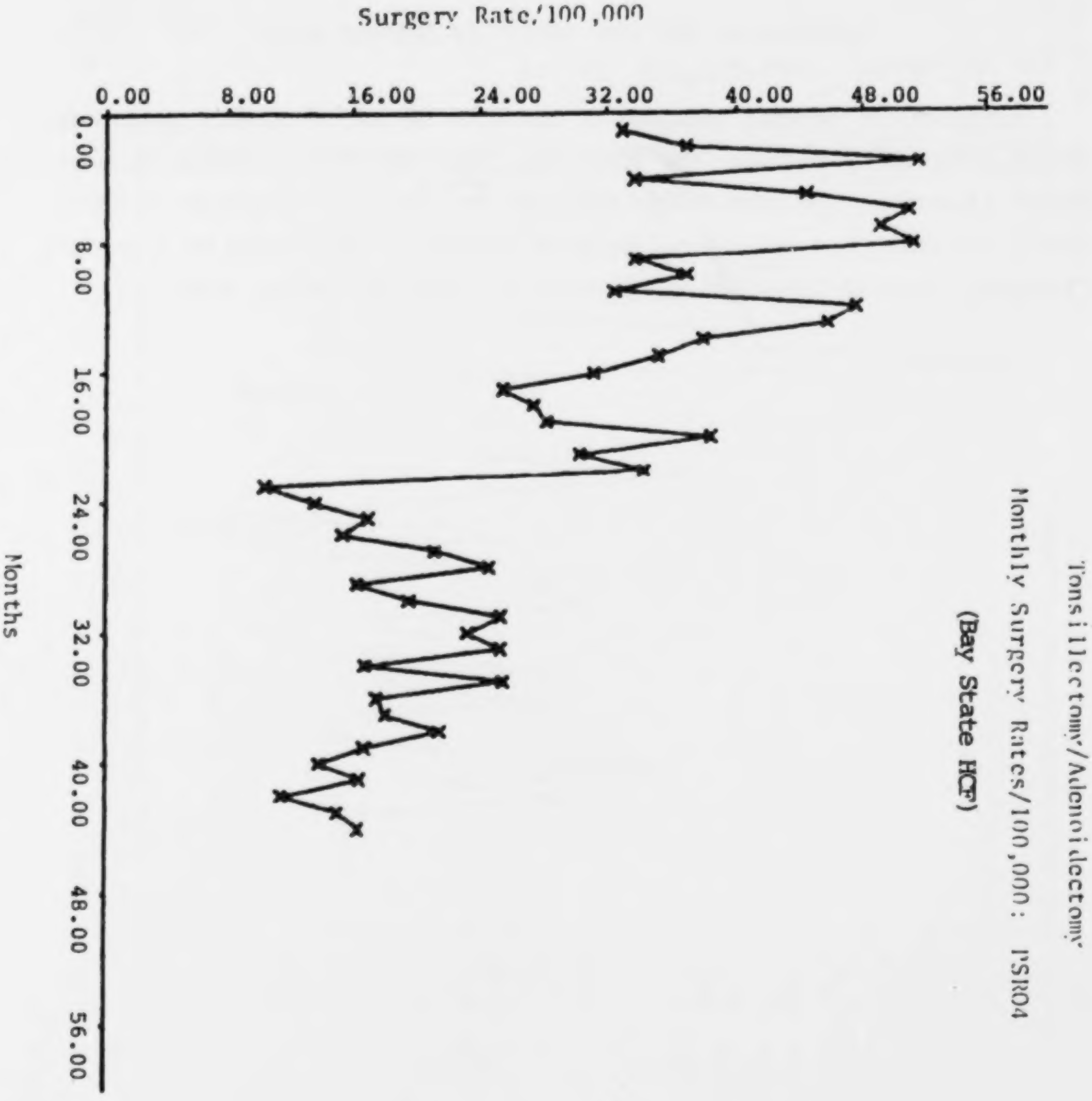
BAY STATE

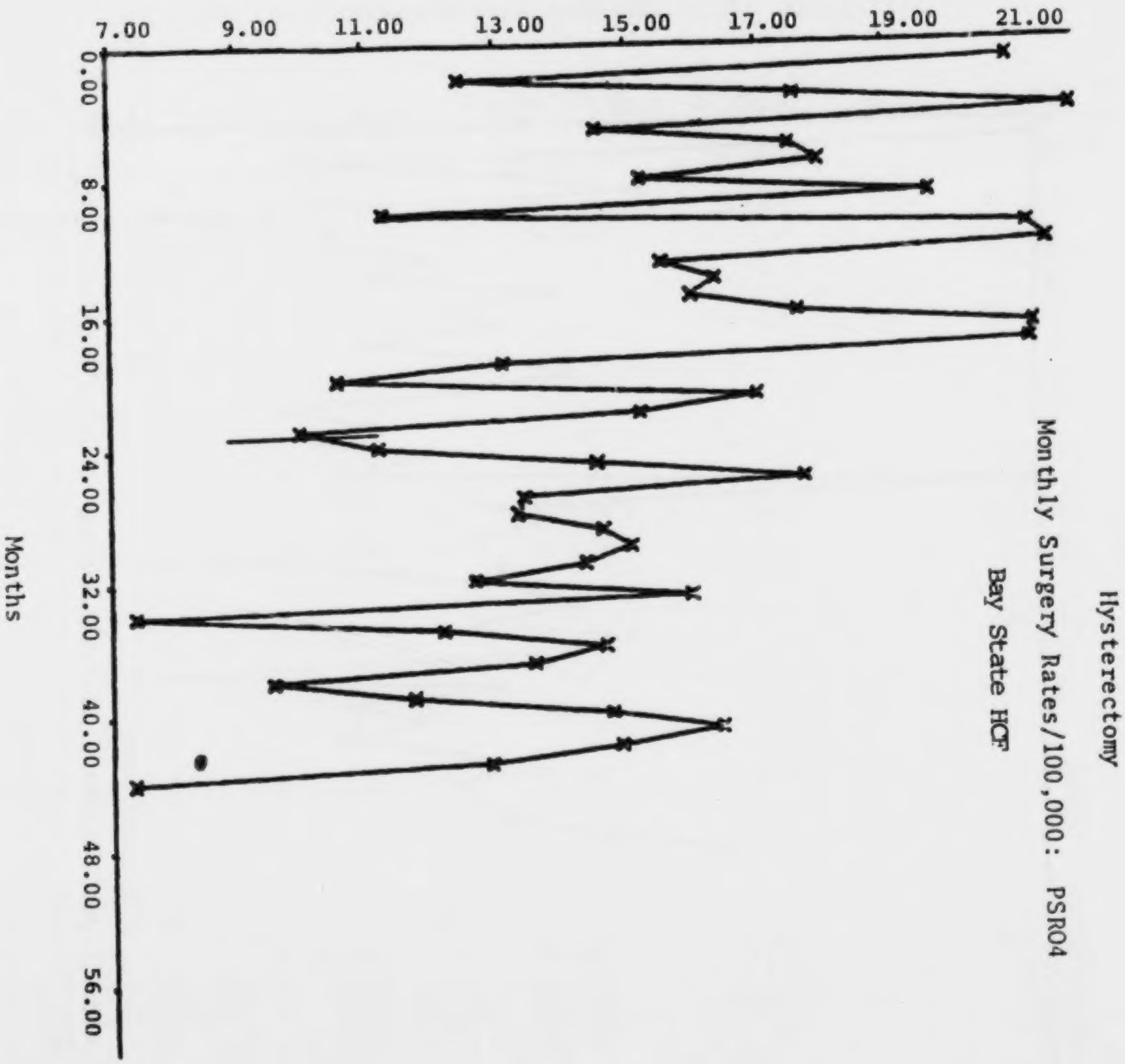


APPENDIX 23

EXAMPLES OF THE TIME SERIES OF SURGERY RATES

Attached are several examples of the time series of surgery rates over the 44 month study period. The first two (T&As and hysterectomies in Bay State) illustrate the drop model; the last one (cholecystectomies in Bay State) illustrates a case where there is no effect. An example of a gradual declining trend is presented in Appendix 22 (T&As in Western Mass.).

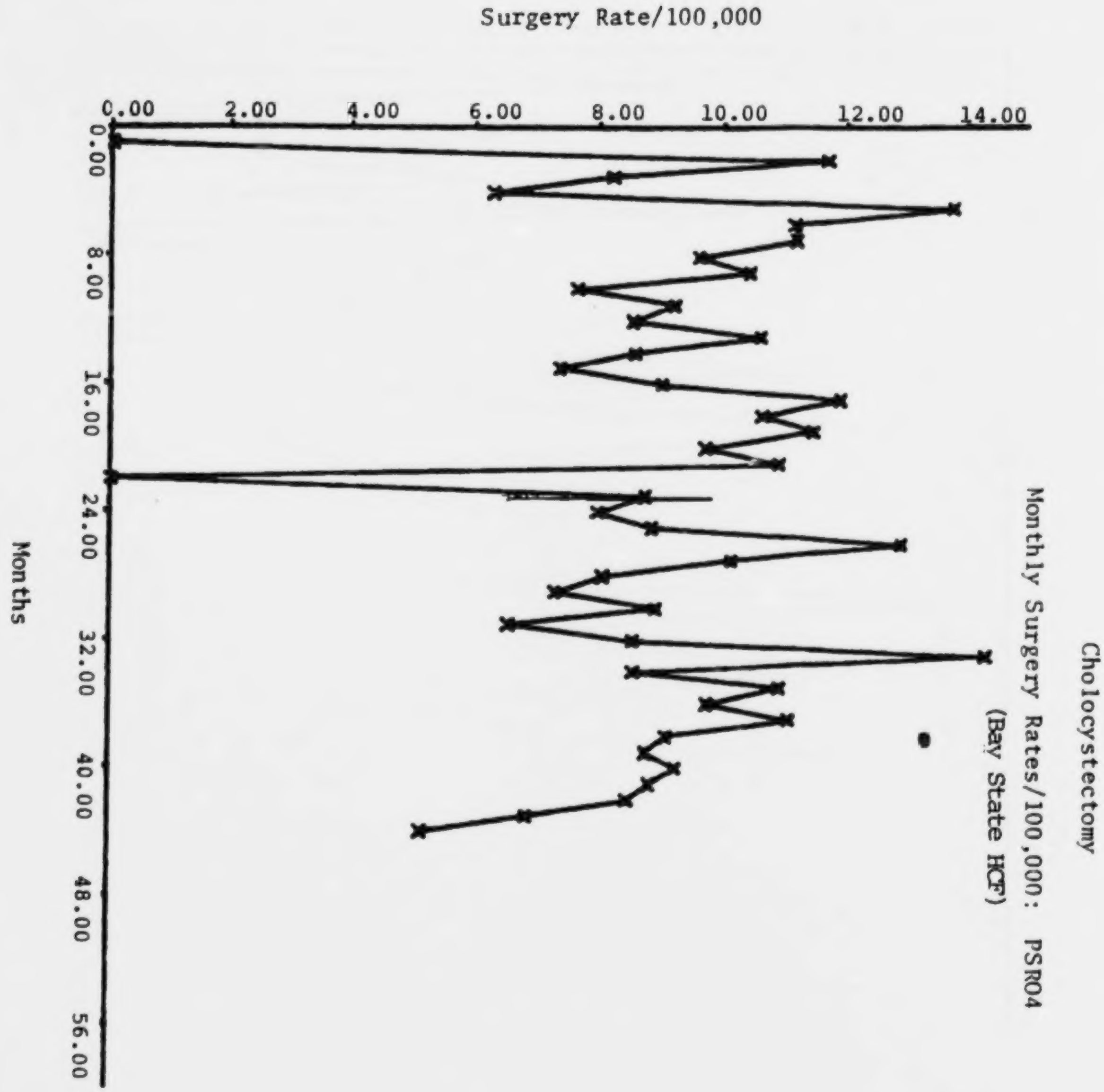

Tonsillectomy/Adenoidectomy
Monthly Surgery Rates/100,000: PSR04
(Bay State HCF)



Hysterectomy

Monthly Surgery Rates/100,000: PSRO4

Bay State HCF



Cholocystectomy
Monthly Surgery Rates/100,000: PSRO4
(Bay State HCF)

APPENDIX 24

BREAKDOWN OF STATEWIDE ESTIMATE OF CPES COSTS AND SAVINGS

Western		Average Cost		Gross		Estimated Costs Related Surgery		Savings Net of Related Surgery Costs
71 Hysterectomies	x	1748	=	124,108	-	10,549	=	113,559
29 SMR	x	883	=	25,607	-	256	=	25,351
								138,910
						*Program Costs		-50,595
						Net Savings		$88,315
Central Mass								
82 T & A	x	534	=	43,788	-	263	=	43,525
9 Hemorrhoidectomy	x	1285	=	11,565	-	4,626	=	6,939
33 SMR	x	883	=	29,139	-	291	=	28,848
20 Hysterectomies	x	2079	=	41,580	-	3,534	=	38,046
						8,714		117,358
						*Program Costs		-56,346
								$61,012
Charles River								
17 Hysterectomies	x	2018	=	34,306	-	2,916	=	31,390
								-16,519
						*Program Costs		$14,871
Bay State								
391 T & As	x	592	=	231,472	-	1,389	=	230,083
19 Hemorrhoidectomy	x	1641	=	31,179	-	12,472	=	18,707
25 Menisectomies	x	1950	=	48,750	-	10,871	=	37,879
9 SMRs	x	1188	=	10,692	-	107	=	10,585
27 Excision of Varicose Veins	x	1616	=	43,632	-	0	=	43,632
115 Hysterectomies	x	2551	=	293,365	-	24,936	=	268,429
								609,315
						*Program Costs		-122,401
								$486,914
Southeastern Mass.								
168 T & As	x	431	=	72,408	-	434	=	71,974
12 Hemorrhoidectomy	x	1108	=	13,296	-	5,318	=	7,978
45 Cholecystectomy	x	1739	=	78,255	-	4,539	=	73,716
14 Menisectomies	x	1406	=	19,684	-	4,390	=	15,294
53 Hysterectomies	x	1781	=	94,393	-	8,023	=	86,370
								255,332
						*Program Costs		-47,938
								$207,394

* includes a 1/5 share of DPW administrative costs

APPENDIX 25

CALCULATIONS OF ESTIMATES OF PROGRAM SAVINGS FROM FORGONE SURGERIES

Bay State HCF - Maximum Estimate of Savings Based On Analysis of Program Referrals

Procedure	Average Cost	Number of Forgone Surgeries	Gross Savings	Actual Payments For Related Surgeries	Gross Savings Adjusted For Costs of Related Surgeries	Program Costs	Net Savings
T&A	$592*	160	$93,080	$0	$93,080	$45,292	$47,151
Hem	1641	16	26,256	9,782	16,474	2,427	14,047
Chol	2716	27	73,332	4,776	68,556	11,657	56,899
Meni	1950	45	87,750	19,011	68,739	7,376	61,363
SMR	1188	33	39,204	0	39,204	9,018	30,186
VV	1616	23	37,168	0	37,168	4,748	32,420
Hyst	2551	113	288,263	24,791**	263,472	34,452	229,020
SF/Disc	4443	31	138,209***	0	138,209	6,794	131,415

---

* 5 T&As were assigned savings of $264 each because these patients had a myringotomy and the marginal cost of a T&A would be $264 (reflecting difference in average cost between patients having a T&A and a myringotomy versus a myringotomy alone).

** Estimated based on average Medicaid payments for patients having related surgery.

*** Includes an adjustment for 8 patients who did not have a myleogram ($59.50) for reasons discussed in Appendix 9.

APPENDIX 25 CONT.

Bay State HCF - Minimum Estimate of Savings Based On Analysis of Program Participants

Procedure	Number of Forgone Cases	Average Cost Per Procedure	Gross Savings	Related Surgery Costs	Adjusted Savings	Program Costs	Net Savings
T&A	41	$592	$24,272	$ 0	$24,272	$45,929	$-21,657
Hem	1	1641	1,641	0	1,641	2,427	-786
Chol	4	2716	11,044	0	11,044	11,657	-613
Meni	17	1950	33,150	3,169	29,981	7,376	22,605
SMR	10	1188	11,880	0	11,880	9,018	2,862
VV	4	1616	6,464	0	6,464	4,748	1,716
Hyst	43	2551	109,693	14,839	94,854	34,452	60,402
SF/Disc	10	4443	44,430	0	44,430	6,794	37,636
TOTAL	130	-	$242,834	$18,008	$224,826	$122,402	102,165

APPENDIX 25 CONT.

Central Mass. HCF - Maximum Estimate of Savings Based On Analysis of Program Referrals

Procedure	Number of Forgone Surgeries	Average Cost	Gross Savings	Actual Payments for Related Surgeries	Gross Savings Adjusted for Costs of Related Surgeries	Program Costs	Net Savings
T&A	46	$534*	$22,924	$696	$22,228	$30,734	$-8,506
Hem	1	1,285	1,285	0	1,285	1,032	253
Chol	5	1,912	9,560	0	9,560	4,148	5,412
Meni	6	1,401	8,406	2,430	5,976	2,669	3,307
SMR	26	883	22,958	631	22,327	6,541	15,786
VV	7	1,313	9,191	0	9,191	1,533	7,658
Hyst	14	2,079	29,106	1,967**	27,139	6,390	20,749
SF/Disc	4	3,351	13,404	0	13,404	3,299	10,105
TOTAL	109	-	$115,804	$4,694	$111,110	$56,346	$54,764

---

* Five patients having myringotomies were assigned marginal cost of T&A @ $206 each.

** Estimated based on a sample of patients having related surgery.

APPENDIX 25 CONT.

Central Mass. HCF - Minimum Estimate of Savings Based On Program Participants

Procedure	Number of Forgone Surgeries	Average Cost	Gross Savings	Actual Payments for Related Surgeries	Gross Savings Adjusted for Costs of Related Surgeries	Program Costs	Net Savings
T&A	27	$ 534	$14,418	$ 0	$14,418	$30,734	$-16,316
Hem	0	1,285	0	0	0	1,032	-1,032
Chol	0	1,912	0	0	0	4,148	-4,148
MEni	1	1,401	1,401	0	1,401	2,669	-1,268
SMR	7	883	6,181	631	5,550	6,541	-991
VV	1	1,313	1,313	0	1,313	1,533	-220
Hyst	8	2,079	16,632	984*	15,648	6,390	9,258
SF/Disc	3	3,351	10,053	0	10,053	3,299	6,754
TOTAL	47	-	$50,046	$1,615	$48,431	$56,346	-7,963

* Estimated base-l on a sample of patients having related surgery.

APPENDIX 25 CONCLUDED

Bay State and Central Mass. HCFs - Maximum Estimates Based on Surgery Rate Analysis

These estimates are presented in Appendix 24, page 199.

Bay State and Central Mass. HCFs - Minimum Estimates Based on Surgery Rate Analysis

These estimates are also presented in Appendix 24. The figures for each of the procedures is the same in both the minimum and maximum estimates, but the minimum estimate includes only the following procedures:

For Bay State HCF:
- T&A
- Hemorrhoidectomy
- Menisectomy
- Hysterectomy.

For Central Mass. HCF:
- Submucous resection;
- Hysterectomy.

Health Care Financing Grants and Contracts Reports

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